THE MARINE RECORD.

DEVOTED TO COMMERCE, ENGINEERING AND SCIENCE.

$2.00 PER YEAR. ESTABLISHED 1878. 10c. SINGLE COPY.

VOL. XVII. CLEVELAND, OHIO, JULY 19, 1894. NO. 29

LAKE CARRIERS' ASSOCIATION.

To consider and take action upon all general questions relating to the navigation and carrying business of the Great Lakes, maintain necessary shipping offices and in general to protect the common interest of Lake Carriers, and improve the character of the service rendered to the public.

PRESIDENT:

JAMES CORRIGAN, - - Cleveland, Ohio.

SECRETARY:

CHARLES H. KEEP, - - Buffalo, N. Y.

TREASURER:

GEORGE P. MCKAY, - Cleveland, Ohio

COUNSEL:

HARVEY D. GOULDER, - Cleveland, Ohio.

VICE PRESIDENTS:

E. M. PECK,	Detroit.	GEORGE G. HADLEY,	Toledo.
WASHINGTON BULLARD,	Buffalo.	H. A. HAWGOOD,	Cleveland.
J. S. DUNHAM,	Chicago.	JAMES MCBRIER,	Erie.
A. B. WOLVIN,	Duluth.	DAVID VANCE,	Milwaukee.
C. A. EDDY,	Bay City.	F. J. FIRTH,	Philadelphia.

BOARD OF MANAGERS:

S. D. Caldwell,	Buffalo, N. Y.	E. M. Peck,	Detroit, Mich.
Peter P. Miller,	Buffalo, N. Y.	D. C. Whitney,	Detroit, Mich.
E. T. Evans,	Buffalo, N. Y.	H. S. Hodge,	Detroit, Mich.
James Ash,	Buffalo, N. Y.	A. A. Parker,	Detroit, Mich.
W. Bullard,	Buffalo, N. Y.	J. L. Higgie,	Chicago, Ill.
J. J. H. Brown,	Buffalo, N. Y.	Jesse Spaulding,	Chicago, Ill.
John Gordon,	Buffalo, N. Y.	J. S. Dunham,	Chicago, Ill.
John Rice,	Buffalo, N. Y.	John Keith,	Chicago, Ill.
M. M. Drake,	Buffalo, N. Y.	Jos. Austrian,	Chicago, Ill.
W. P. Henry,	Buffolo, N. Y.	W. R. Owen,	Chicago, Ill.
Edward Smith,	Buffalo, N. Y.	C. W. Elphicke,	Chicago, Ill.
James McKenzie,	Buffalo, N. Y.	W. M. Egan,	Chicago, Ill.
Thomas Wilson,	Cleveland, Ohio.	George G. Hadley,	Toledo, Ohio.
M. A. Bradley,	Cleveland, Ohio,	W. S. Brainard,	Toledo, Ohio.
James Corrigan,	Cleveland, Ohio.	L. S. Sullivan,	Toledo, Ohio.
H. M. Hanna,	Cleveland, Ohio.	A. W. Colton,	Toledo, Ohio.
George P. McKay,	Cleveland, Ohio.	James Davidson,	Bay City, Mich.
H. G. Dalton,	Cleveland, Ohio.	Charles A. Eddy.	Bay City, Mich.
Harvey H. Brown,	Cleveland, Ohio.	O. W. Blodgett,	Bay City, Mich.
John W. Moore,	Cleveland, Ohio.	F. W. Wheeler,	Bay City, Mich.
B. L. Pennington,	Cleveland, Ohio.	Alex. McDougall,	Duluth, Minn.
W. J. White,	Cleveland, Ohio.	David Vance,	Milwaukee, Wis.
Henry A. Hawgood,	Cleveland, Ohio.	R. P. Fitzgerald,	Milwaukee, Wis.
W. C. Richardson,	Cleveland, Ohio.	J. C. Ricketson,	Milwaukee, Wis.
J. C. Gilchrist,	Cleveland, Ohio.	Conrad Stark,	Milwaukee, Wis.
W. D. Rees,	Cleveland, Ohio.	F. W. Gilchrist,	Alpena, Mich.
John Mitchell,	Cleveland, Ohio.	Alvin Neal,	Port Huron, Mich.
R. R. Rhodes,	Cleveland, Ohio.	C. T. Morley,	Marine City, Mich.
Caleb E. Gowen,	Cleveland, Ohio.	W. E. Chapman,	Sandusky, Ohio.
James W. Millen,	Detroit, Mich.	Frank J. Firth,	Philadelphia, Pa.
W. Livingstone, Jr.,	Detroit, Mich.	Frank Owen,	Ogdensburg, N. Y.
David Carter,	Detroit, Mich.		

COMMITTEE ON FINANCE:

H. M. Hanna,	Cleveland, Ohio.	D. C. Whitney,	Detroit, Mich.
H. H. Brown.	Cleveland, Ohio.	W. P. Henry,	Buffalo, N. Y.
James Corrigan.	Cleveland, Ohio.	J. H. Brown,	Buffalo, N. Y.
H. A. Hawgood,	Cleveland, Ohio.	David Vance,	Milwaukee, Wis.
Thomas Wilson,	Cleveland, Ohio.	R. P. Fitzgerald,	Milwaukee, Wis.
M. A. Bradley,	Cleveland, Ohio.	John G. Keith,	Chicago, Ill.
J. C. Gilchrist,	Cleveland, Ohio.	J. S. Dunham,	Chicago, Ill.
E. M. Peck,	Detroit, Mich.		

COMMITTEE ON AIDS TO NAVIGATION:

David C. Carter,	Detroit, Mich.	W. M. Egan,	Chicago, Ill.
H. S. Hodge,	Detroit, Mich.	Frank Owen,	Ogdensburg, N. Y.
George P. McKay,	Cleveland, Ohio.	A. W. Colton,	Toledo, Ohio.
H. G. Dalton,	Cleveland, Ohio.	James Davidson,	Bay City, Mich.
B. L. Pennington,	Cleveland, Ohio.	Alvin Neal,	Port Huron, Mich.
W. C. Richardson,	Cleveland, Ohio.	E. T. Evans,	Buffalo, N. Y.
Thomas Wilson,	Cleveland, Ohio.	Washington Bullard,	Buffalo, N. Y.
John W. Moore,	Cleveland, Ohio.		

COMMITTEE ON LEGISLATION:

S. D. Caldwell,	Buffalo, N. Y.	Wm. Livingstone, Jr.,	Detroit, Mich.
James Ash,	Buffalo, N. Y.	James Millen,	Detroit, Mich.
E. T. Evans,	Buffalo, N. Y.	Jesse Spaulding,	Chicago, Ill.
P. P. Miller,	Buffalo N. Y.	C. A. Eddy,	Bay City, Mich.
John Gordon,	Buffalo, N. Y.	Alex. McDougall,	Duluth, Minn.
Wash. Bullard,	Buffalo, N. Y.	W. S. Brainard,	Toledo, Ohio.
H. M. Hanna,	Cleveland, Ohio.	F. J. Firth,	Philadelphia, Pa.
James Corrigan,	Cleveland, Ohio.		

COMMITTEE ON INSURANCE:

W. S Mack,	Cleveland, Ohio.	John Rice,	Buffalo, N. Y.
H. A. Hawgood,	Cleveland, Ohio.	Edward Smith,	Buffalo, N. Y.
J. C. Gilchrist,	Cleveland, Ohio.	W. S. Brainard,	Toledo, Ohio.
J. T. Hutchinson,	Cleveland, Ohio.	W. M. Egan,	Chicago, Ill.
A. A. Parker,	Detroit, Mich.		

AMERICAN REGISTRY.

Vessels can be registered as vessels of the United States only if they are built within the United States and belong wholly to citizens of the United States, or if they are prizes captured in war, or have been wrecked within the United States, the repairs constituting three-fourths of the value of the vessel, and the ownership, as above, is wholly in citizens of the United States. Even then a vessel is not entitled to American registry if a part of it is owned by a native-born citizen who resides abroad, unless he is a consul or a partner in an American firm actually engaged in the foreign commerce of the United States, or if a part of it is owned by a naturalized citizen who lives more than a year in the country of his birth, or more than two years in any other foreign country, unless he is an agent of the government. In spite of these stringent provisions, the sale to a foreigner of stock in a corporation owning American ships does not vitiate the registry of any of them. The American ownership has to be sworn to every time the vessel enters port from a foreign country. The master and officers must be citizens of the United States, except that if a vessel loses an officer on a foreign voyage, including voyages from our Atlantic to our Pacific ports, an alien may serve as an officer till the ship reaches her home port. Aliens who have declared their intention of becoming citizens, and have lived in this country the six months immediately preceding, may be licensed as pilots or engineers on American steam vessels. Vessels having postal subsidies under the law of 1891 must have American citizens as a part of their crews to the extent of one-fourth for the first two years, one-third for the next three years and one-half thereafter.

In 1872 Congress gave ship builders the privilege of importing free of duty certain materials for ship building, and the tariff law of 1890 extended this privilege to cover about all the materials used in iron and steel ship building.

IMPORTS AND EXPORTS.

The report of the bureau of statistics of the total of the imports and exports of the United States for the 12 months ending June 30, 1894, shows an excess of exports over imports of $237,275,407; while for 1893 the imports exceeded the exports by $18,735,728. The exports of gold for the year amounted to $77,038,729, against $108,680,844 during 1893. The exports of silver during the 12 months aggregated $50,451,043 and the excess of exports over imports was $37,168,438, against $17,544,087 for last year.

COAST SEAMEN'S WAGES.

The shipping men along South street, New York, whose business it is to ship crews for foreign and coastwise voyages, say that not for along time has it been so easy to get good seamen at low wages as at present. The streets are full of sailors. They are out of a berth and are looking for another. A ship owner remarked this week: "Why, let it be understood that I want a man and this office would be overrun with them." The effect of the prevailing hard times is felt by this class of labor as by any other. With slack business comes a lighter demand for tonnage and less need of sailors. The prices of sailors' labor fluctuates like any commodity. A year ago at this time sailors were being paid from $20 to $25 per month, but at present the regular figure is $16 per month.

NEW CANADIAN LINE OF STEAMSHIPS.

Hon. George Foster, finance minister has introduced in the Dominion House of Commons a resolution granting a subsidy of $750,000 to a fast Atlantic line of steamers plying between Halifax, N. S., or St. John, N. B., on the Canadian side, and a port in England, with a cross line to France. This line of steamships is to be equal to any of the New York lines with which it will compete. The rate of speed is to be twenty knots an hour, and the carrying capacity of the vessels 10,000 tons register, giving a passenger and freight service. There will be in all four new vessels. The resolution gives power to the government to enter into a contract for twenty years. The subsidy for the first ten years will be $750,000, and for the next ten years $500,000. The line is to complete the link to make an imperial highway from Great Britain to the Pacific and Australia.

TO REGULATE DRAWBRIDGES.

Relative to drawbridges the law has been amended as follows: That it shall be the duty of all persons owning, operating, and tending the drawbridges now built, or which may hereafter be built across the navigable rivers and other waters of the United States, to open, or cause to be opened, the draws of such bridges, under such rules and regulations as in the opinion of the Secretary of War the public interests require to govern the opening of drawbridges for the passage of vessels and other water crafts. Every such person who shall willfully fail or refuse to open, or cause to be opened, the draw of any such bridge for the passage of a boat or boats, or shall unreasonably delay the opening of said draw after reasonable signal shall have been given, as provided in such regulations, shall be deemed guilty of a misdemeanor, and on conviction thereof shall be punished by a fine of not more than $2,000, nor less than $1,000, or by imprisonment (in the case of a natural person) for not exceeding one year, or by both such fine and imprisonment, in the discretion of the court.

The bridges shall be opened promptly upon reasonable signal for the passage of vessels and boats, and it is hereby declared to be unlawful to obstruct, hinder, or unreasonably delay the passage of vessels and boats through the draws of such bridges.

The rules governing drawbridges shall be under such rules and regulations as in the opinion of the Secretary of War the public interests require to govern the opening of drawbridges for the passage of vessels and other water crafts, and such rules and regulations, when so made and published, shall have the force of law.

COMPOSITE AND SHEATHED SHIPS.

Another class of vessels, for which the composite system of construction is still found to be the best, are lightships, which require considerable strength, but in a way that is easily met by this build. It is desirable to have light-vessels sheathed with copper, otherwise the growth of sea plants and animals upon them would be very considerable in a short time, and frequent docking would, in their case, involve great expense. Composite lightships of recent type have, like the ordinary composite sailing-vessel, one thickness of plank fastened to the frames by yellow metal nut and screw bolts. Those built for the Trinity House have also the usual sheer-strake, bilge-strake and plate keel of iron, and the diagonal tie plates connecting with the sheerstrake plates and bilge plates; but they have also in addition diagonal tie plates in the bottom, ranging from the keel plate to the bilge plates. Other light authorities of the United Kingdom have in some cases had sheathed ships built for the purpose, but we should think they will in time be found to suffer from the same disadvantages as those which have been described in connection with the Royal Navy.—*Nautical Magazine.*

REDUCTION IN STEERAGE RATES.

The announcement made on Saturday by the American Line that it would make a rate of less than $10 from English ports to this country came something in the nature of a surprise. The new rate is a cut of $5 in the rate put in force last Wednesday by the White Star people, which at that time was looked upon as a decisive cut.

At the present time the White Star Line makes a rate of $10 to English ports and $15 from them. The American Line makes a $10 rate to English ports and $8.64 from them. It is thought that the White Star people will meet this rate in the near future.

NEWS AROUND THE LAKES.

CHICAGO, ILL.

Special Correspondence to The Marine Record.

C. F. Elmes supplied the steamer M. C. Neff with a new crank shaft.

J. G. Keith & Co. chartered the steamer Iron Duke and consort Iron State for Buffalo at ⅞ of a cent.

Palmer, Cook and Calbick chartered the steamer New Orleans for wheat to Kingston at 2¼ cents.

Capt. John Prindiville chartered the steamers Brittanic and Quito for wheat to Milwaukee, the schooner Sunrise to Port Huron with corn at 1 cent.

Last Friday saw the lowest open rate ever made on wheat to Buffalo recorded. The steamers C. S. Parnell and City of Rome having been placed at ⅞ of a cent.

Since my last letter the O. S. Richardson Fueling Co. have had the steamers Escanaba, Rube Richards and Samoa arrive and unload soft coal at their vessel coaling docks.

P. H. Fleming & Co. chartered the steamer Norwalk for 50,000 bushels wheat to Kingston at 2¼ cents, the steamer Parks Foster for 90,000 bushels wheat to Buffalo.

Engineer Charles Connell and wheelsman Robert J. LeRoy, two of the victims of the fire on the steamer Myrtie M. Ross on the 10th, died at South Haven on the morning of the 12th instant.

At Miller Brothers' shipyard the schooner Ann Maria was in dock for a piece of new keel, repairs to her rudder and some calking. The schooner J. G. Blaine for some bottom calking, the schooner Commerce for some new bottom plank, the steamer Mabel Bradshaw for a new wheel, the steamer Soo City for repairs to her wheel, the steamer Sailor Boy for a new wheel.

Capt. James Travis of the steamer W. L. Worthington which arrived here with her two consorts D. R. Martin and T. J. Bronson, laden with lumber Friday morning, reported that Charles Bodar, a sailor on the D. R. Martin, fell overboard when off Waukegan Thursday. Bodar caught hold of the tow line running between the Martin and Bronson and held on for a while; a yawl boat was lowered but before it could reach him he lost his hold of the line and sank.

Peter Marcoux has been appointed chief engineer of the steamer Parks Foster. He has been in the service of the Owen Line six years. He has gained his present position by honest perseverance and true merit, and is well deserving of his success. He was 2nd engineer two and one-half years and chief engineer two years on the steamer Argonaut and chief engineer on the steamer Escanaba one and one-half years.

The sloop yacht Irene arrived here from Omaha Friday. The Irene was built at Omaha and is of the following dimensions: 20 feet over all, 6 feet 6 inch beam, 3 feet hold. She has auxilliary power, supplied by a Sintz two horse-power gas engine and has ten tanks on board which will contain 400 gallons of gasoline. George B. Carpenter & Co. supplied her with a full set of sails, which comprise mainsail, gafftopsail, stay sail, jib, jibtopsail and spinnaker. J. F. Shepard, her captain and owner and his friend Charles Mattox intend making a tour of the Lakes, then down the St. Lawrence to the Atlantic Ocean, whence they will voyage south to spend the winter.

The schooner Marengo when going up the south branch to unload her cargo of coal, in tow of the tugs William Dickinson and Ira O. Smith, had her jibboom and fore and main topmasts carried away by collision with the new South Halsted street lift bridge Monday morning about 6 o'clock. The bridge-tender had signalled to the tugs to come along with the schooner but failed to hoist the bridge high enough to let her pass under. The bridge sustained damage to the mechanism. A cog-wheel in the gearing which moves the drum on which the cables are wound gave away and the bridge remains stationary near the top. The bridge-tender and four men who were on the bridge when it ascended spent Monday night and Tuesday upon it.

The Henderson Feed Water Purifier placed on the boiler of the tug William Dickinson has proved a great success. Miles Barry, Superintendent of the I. T. Line says: Two weeks ago we had one of the Henderson Feed Water Purifiers placed on the boiler of our tug Wm. Dickinson. During the past two weeks she has been up in the south fork of the river as far as 39th street (commonly known as the Stock Yards District) at various times and has had to do some heavy work there. As it is our custom to wash our boilers every two weeks, we thought it advisable to do so again so as to compare results. To say that we were surprised does not express it. Instead of finding from 150 to 200 lbs. of accumulation there was scarcely a pound of deposit to be found. It not only prevents scaling but leaves the water clear as crystal. We are so well pleased that we have given orders to have our other boats fitted with it.

Allison V. Armour, who owned the steam yacht Gryphon last season, has bought the big steam yacht Ituna of New York from August Belmont. Mr. Armour has gone to New York and will soon start in his new craft to Europe. It is thought next winter will be spent in cruising around the Gulf of Mexico and the Caribbean Sea with a run south as far as Rio de Janeiro, and possibly to the Argentine Republic. The Ituna is described as follows: Gross tonnage, 177.53; net, 98.45; length over all, 150 feet; waterline, 135 feet 6 inches; beam, 19 feet 7 inches; depth, 12 feet 3 inches. The yacht has a draft of 10 feet 9 inches, and the engines are triple expansion, measuring 10, 16, and 26 inches by 22 inches stroke. The accommodations and fittings of the Ituna are said to be fine, and in general appearance the yacht bears some little resemblance to the Peerless, which was here last summer.

CLEVELAND, O.

Special Correspondence to The Marine Record.

3,858 tons of ore on 16 feet 10 inches draft, is the record of the Selwyn Eddy this week from Escanaba to Ashtabula.

The iron steamer Devereant docked in the Cleveland Dry Dock this week for bottom repairs on the port side forward. The work was carried out by the Cleveland Ship Building Co.

The passenger service of the Nickel Plate railroad is now fully resumed to the summer resorts, including Chautauqua Lake, Niagara Falls, Thousand Islands, Lower Canadian Provinces and the coast resorts.

Mr. Norman B. Conger, lake marine agent of the Weather Bureau, was at this port on Saturday on his way to Buffalo to join Prof. Mark W. Harrington, Chief of the Bureau, who will proceed to Lake Superior in the interests of the service.

Mr. John F. Pankhurst, General manager of the Globe Iron Works Co., and his family started away on a Lake Superior tour last week. It is learned that an excellent time is being enjoyed by the party.

On the up trip the North West arrived here and left again on schedule time, Wednesday. Leaving Detroit, the passenger list will be swelled to 365 persons, at least that number was booked for this trip from the three ports of Buffalo, Cleveland and Detroit. The engines and boilers of the big boat are now doing excellent work and later in the season, she will be speeded up to the highest possible notch.

The passenger steamer Lora arrived here, Tuesday, en route to the Thousand Islands. The present is the first of a series of eight trips which she will make during the summer to this favorable resort on Lake Ontario. The passenger rate is extremely low and a large patronage is already assured.

Mr. G. C. Barnes of the Chase Machine Co., having recently been elected councilman by a favorable majority, is now a candidate for the office of sheriff. There are few men better fitted to carry out the duties of sheriff than is Mr. Barnes, who, besides having a thorough military training, is a commercial man of repute and enjoys the friendship of a large circle of acquaintances.

The damage which the Buffalo fire boat caused to the passenger steamer State of New York is more extensive than was anticipated. Temporary repairs have been made to keep the vessel in a staunch, seaworthy condition until the end of the season, when a final survey will take place and permanent repairs made.

At the yards of the Globe Iron Works Co., the steam pipe and shaft for the North Land, sister ship to the North West, has been put in this week. The large new steel freight steamer is about two-thirds plated and the cabin work is well advanced. On repair work the Minnesota Line steamer Maruba has had her stem scarphed and several new bottom plates.

Capt. Alex. McMasters, Supervising Inspector of Steamboats for this district, with offices at Buffalo, visited the local office and shipbuilding yards on Wednesday. It is a pleasure to note that this district has one of the most efficient officers in the service and many will regret the retirement of Capt. McMasters, if the change in the administration insists upon superseding him.

Capt. Henry A. Hawgood has returned from his visit to Europe much improved in health and looking first-class.

The harbor front was dotted with white wings on Saturday morning on the occasion of the deferred regatta being held. There was a little more wind on the 15th than there was on the 4th, but towards the end of the race the breeze died out and the race was declared off for a more favorable day.

The steel steamer Grecian is in the Cleveland dry-dock, where she received a partial examination and survey by Capt. George P. McKay, manager of the line, and Mr. Joseph R. Oldham. There are nine broken plates forward and two aft. How many frames are broken could not be learned until the plates were removed. The Grecian was one of the victims of the rocky obstructions in the "Soo" Canal. The Minnesota Line steamer Maruba, which struck in the same place, and which is in the Ship Owners' dry dock, had her stem broken and fourteen of her plates had to be taken off, eight of these having to be replaced with new ones. Mr. Oldham also acted for the owners and underwriters on the survey and final repairs to the Maruba.

The friends of Capt. Alfred C. Chapman, master of the Menominee Line steamer Briton, have been somewhat surprised this week by the announcement that he had taken to himself a wife. The Briton arrived at Ashtabula on Sunday and Capt. Chapman hurried to the city on the first train, secured the license, and was united in marriage in the evening, to Miss Lavinia Richards at the home of the brides mother, No. 210 Beach street, Chaplain J. D. Jones of the Floating Bethel, officiating. The bride is an old neighbor of the captain, living only a few doors from his house. The happy couple are taking their wedding trip without interruption to business. The bride and a young daughter of the gallant captain accompanied him up the lakes for a honeymoon trip on the Briton, and no more enjoyable a cruise could have been taken by the happy couple. The many friends and acquaintances of Capt. Chapman wish him and his charming consort much prosperity, a part of which will no doubt be due to the shipshape way in which Chaplain Jones tied the knot.

The mission boat on wheels, now doing evangelistic work at this port under the guidance of Chaplain Jones of the Floating Bethel, is getting to be quite an institution. Heaving-to at the corner of Superior and Seneca streets Wednesday night I heard a most interesting discourse from the "skipper" and then his hearty crew put up petitions in prose and praise about souls, heaven, mercy and such. Getting under way again I sailed around the little craft and admired the ship-shape rig very much, especially the hurdy-gurdy placed forward and the manipulators thereof. We used to say "the farther forward the better the man," but in this case another syllable should be added because one of Eve's daughters presided at the air disturber. In sailing around over bridges and under arches like the Chaplain does, especially where he has such a foul and rocky bottom to traverse, I would advise him to throw a shank painter over his starboard anchor, also, for the sake of looks, to shackle the cable to the ring instead of the ring to the cable, or, in other words, place the round part of the shackle to the ring of the anchor, instead of the pin, as it then was.

AIDS TO NAVIGATION.

As finally reported in the Senate, the river and harbor bill increases Michigan appropriations as follows: Frankfort, from $20,000 to $50,000; Holland, from $5,000 to $15,000; South Haven, from $10,000 to $20,000; Saugatuck, from $5,500 to $12,000; improving waterway across Keweenaw point, from $125,000 to $160,000. Senator McMillan continues his efforts for an appropriation for lights on North Manitou and Death's Door channel in Lake Michigan, although there is a disposition to defer action until next year.

Waukegan, Ill., from $12,000 to $20,000: Kenosha, Wis., from $10,000 to $15,000; Kewaunee, Wis, from $15,000 to $20,000; Manitowoc from $15,000 to $25,000; Racine from $15,000 to $20,000; Superior and St. Louis Bay from $40,000 to $50,000; Sheboygan from $22,439.56 to $25,000; Duluth from $50,000 to $75,000; Agate Bay, Minn., from $25,000 to $30,000.

Great Sodus Bay, N. Y., from $8,000 to $15,000. For improving the harbor at Oswego $37,000, "of which $10,000 shall be expended in repairing the break recently made in the breakwater," and "$10,000, which may, in the discretion of the Secretary of War, be used for removing rock to widen and deepen the inner harbor near the mouth of the Oswego river;" Two Rivers, Wis., from $3,000 to $6,000; Cleveland from $40,000 to $50,000.

Improving harbor at Sandusky, Ohio: Continuing improvement, $25,000, $5,000 of which may be used in removing shoal at outer approach to harbor; and the Secretary of War is authorized and directed, in his discretion, to cause a survey, if necessary, for the purpose, and an estimate to be made of the cost of further necessary improvement of said harbor, including the channel over said outer bar.

Improving harbor at Toledo, straight channel through Maumee Bay, Ohio: Continuing improvement, from $60,000 to $75,000, a part of which may be used, in the discretion of the Secretary of War, in remving shoal in the old channel and in extending the improvement up the Maumee river.

In the river and harbor bill, which is now before the Senate, a change was made in the paragraph relating to Tonawanda harbor and Niagara river which is said to meet with the approval of those most interested in the improvement of the river and harbor. The House provision calling for the expenditure of $50,000 for continuing the improvement is accepted, and in addition it is ordered that $20,000 be appropriated for the improve-

ment of the river from Tonawanda to Port Day. This amount is to be made available in addition to the unexpended balance of the appropriations heretofore authorized. This change was made at the instance of Senator Murphy.

The Secretary of War reported to the House, in reply to Mr. Thomas' resolution, that the chief of engineers did not feel authorized to furnish a further or supplementary report and estimate on the Saugatuck harbor project without the authority of a joint resolution of Congress. Dr. Thomas will now try it again. He will reintroduce his previous resolution as a joint resolution and again undertake to get unanimous consent for its consideration.

The House committee on interstate and foreign commerce has been considering the Breckinridge bill requiring people who reside on boats on lakes, rivers and interior waters of the United States to pay a license. This has been amended by making it apply only to the Ohio and Mississippi rivers, thus removing the serious objections of the representatives of the Great Lake districts. In this form it has been favorably reported.

RAILROAD INTERESTS AND TRANSPORTATION.

We have been favored by the Interstate Commerce Commission with a synopsis of their forthcoming report, from which it appears that:

The total mileage of railways in the United States on June 30, 1893, was 176,461.07, being an increase during the year of 4,897.55 miles. The corresponding increase during the previous year was 3,160.78, from which it appears that there was some revival in railway construction during the year covered by the report. The state of Washington leads in construction with 556.32 miles; Montana shows an increase of 409.66 miles; Minnesota of 406.69 miles, and West Virginia of 365.01 miles. The other states which show an increase in mileage in excess of 100 miles are California, Florida, Indiana, Michigan, Missouri, New York, Ohio, Pennsylvania, Texas, Wisconsin and Wyoming. The states of Kansas, Oregon, the territory of New Mexico, and the District of Columbia, show a slight decrease in mileage, due to remeasurement of main lines or abandonment of small, unimportant lines. The number of roads abandoned during the year was 19. The total length of line, including all tracks, was 230,137.27, which includes 10,051.36 miles of second track, and 42,043.40 miles of yard track and sidings.

The gross earnings from operations on the railways of the United States for the year ending June 30, 1893, was $1,220,751,874, being an increase of $49,344,531 over gross earnings reported in the previous year. Operating expenses during the year were $827,921,299, being an increase of $46,923,303 over the previous year. The income from investments reported by the railways was $149,649,615, while deductions on account of fixed changes and other analogous items were $431,422,156. The final net income available for dividends was $111,058,034, being a sum less than the corresponding amount for the previous year of $4,907,157. After deducting from this amount the dividends paid, the income account of railways in the United States for the year 1893 shows a surplus of $8,116,745, which is less than the surplus of the previous year by $5,919,311. The complete report shows a full income account for each of the ten territorial groups into which the country is divided. The gross amount received from carrying passengers was $301,491,816; from carrying the mail, $28,445,053, and from carrying express matter, $23,631,394. The gross amount received for carrying freight was $829,053,861. The passenger service accounts for 29.49 per cent of the earnings from operation, and the freight service for 68.23 per cent of such earnings.

The aggregate of property properly classified as a railway capital was on June 30, 1893, $10,506,235,410, which shows railway capital equal to $63,421 per mile of line. The amount of stock outstanding was $4,668,935,418, of which $3,982,009,602 was common stock, the remainder, $686,925,816, being preferred stock. The funded debt outstanding was $5,225,689,821, classified as follows: Mortgage bonds, $4,504,383,162; miscellaneous obligations, $410,474,647; income bonds, $248,132,730, and equipment-trust obligations, $62,699,282. The amount of investment in the railway securities has increased during the year from $1,391,457,053 to $1,563,022,233, being an increase of $171,565,180.

The amount of stock paying no dividends during the year was $2,859,334,572, being 61.24 per cent of the total stock outstanding. Of stocks paying dividends, 5.25 per cent of the aggregate stock paid from 4 to 5 per cent, 11.62 per cent paid from 5 to 6 per cent, 5.24 per cent paid from 6 to 7 per cent, and 5.32 per cent paid from 7 to 8 per cent. The total dividends paid was $100,929,885. The amount of mortgage bonds paying no interest was $492,276,999, or 10.93 per cent of the total of mortgage bonds, and the amount of income bonds paying no interest was $204,864,269, or 82.56 per cent of the total of income bonds.

THE GREAT SIBERIAN RAILWAY.

As there is now considerable interest manifested in all tributary trades to the Pacific coast and especially that portion which is likely to affect transcontinental and lake traffic, the following consular report of the great Siberian railway may be considered as a direct adjunct to future transportation on the Great Lakes.

Soon after the annexation by the Russian Empire of those vast tracks of land known as the Amour and Littoral territories and the Ussuri country, a serious want was felt for better ways of communication to assist in retaining them, and to induce settlers to occupy and cultivate them. The first to interest himself in the matter of constructing a railway through Siberia was Count Muraviov Amoursky. Next, an Englishman named Dull suggested the plan of constructing a horse railway to one of the Pacific ports, but this scheme did not find supporters. About this time, Mr. Collins, an American citizen, asked the Russian government to grant him the right to form a stock company to operate under the name of the Amour Railway Co. This proposition was rejected A third proposal followed in 1858. In 1862 a scheme was proposed by Kokorev & Co. looking to the uniting of the Volga and Obi basins, the two great rivers of European Russia and Siberia. About the same time a petition was started for the construction of a road from Vladivostok to Lake Khanko. It may be interesting to note that in 1880 the engineer Ostrovsky suggested a through line across Siberia, which almost exactly corresponds with the Great Siberian railway as now in process of construction. In 1890, a special commission was formed under the Imperial Minister Vyshnegradsky looking to the construction of this railway by foreign capital. Several Americans, together with other foreigners, thought seriously of forming a company for the construction of this road, but capitalists abroad hesitated to invest the money requisite for such a mammoth undertaking. On March 17, 1891, in the name of the Czarewich, the question of constructing the Great Siberian railway, as suggested by the present Minister of Finance, was decided in the affirmative. The imperial rescript was promulgated personally by the Czarewich on May 12, in Vladivostok, and His Imperial Highness laid the first stone of this mighty work, destined to take one of the foremost places among the important enterprises of the expiring century.

The total length of the Siberian railway from Cheliabinsk to Vladivostok is 7,083 versts (4,694 miles) on the main line alone. An agent of the great Siberian railway visited New York recently to learn how and at what prices special tonnage could be built to carry on the trade between the Russian terminal on the Pacific and United States ports on the Pacific slope. The town of Vladivostock, in the Sea of Japan, is capable of taking in the largest tonnage and a brisk trade is certain to accrue after the opening of the new line of traffic.

AMPLITUDES.

The following approximate amplitudes of the Sun's rising will be given each week in this column during the season of navigation: A second bearing of the Sun may be taken at sunset by reversing the bearings to read west instead of east, as, for example, N. E. by E. for a sunrise bearing would read N. W. by W. for a sunset, or E. 30° N. to W. 30° N.

LAKE ERIE AND S. END LAKE MICHIGAN. LAT. 42° N.

Sunrise.	Bearing (degrees)	Bearing (points).
July 22	E. 27° N.	NE. by E. ⅝ E.
July 27	E. 26° N.	NE. by E. ¾ E.

LAKE ONT., S. END HURON AND CENTER LAKE MICHIGAN LAT. 44° N.

Sunrise.	Bearing (degrees).	Bearing (points).
July 22	E. 28° N.	NE. by E. ½ E.
July 27	E. 27° N.	NE. by E. ⅝ E.

N. END LAKES HURON AND MICH. LAT. 46° N.

Sunrise.	Bearing (degrees).	Bearing (points).
July 22	E. 30° N.	NE. by E. ⅜ E.
July 27	E. 28° N.	NE. by E. ½ E.

LAKE SUPERIOR. LAT. 48° N.

Sunrise.	Bearing (degrees).	Bearing (points).
July 22	E. 31° N.	NE. by E. ¼ E.
July 27	E. 29° N.	NE. by E. ⅜ E.

With a compass correct magnetic, the difference between the observed and true bearing will be the variation for the locality. If there is any deviation on the course the vessel is heading at the time of taking the bearing the result after the variation is applied will be the amount of deviation on that course.

CANADIAN SAULT STE. MARIE CANAL FINISHED.

A speeial from Ottawa, says the work on the Canadian Sault Ste. Marie Canal is practically finished, and the canal is almost ready for navigation, only some little work on the gates remaining to be done. Hon. Mr. Haggart, minister of public works, will inspect the work immediately after the prorogation of Parliament and the opening of the canal for traffic will take place shortly after.

TRADE NOTES.

The commodious new plant of the Dean Bros.' Steam Pump Works, Indianapolis, Ind., being now completed, they are offering for sale their former admirable works, built specially for foundry and machine shops, with engine, boilers and shafting in place and ready for starting up at once. Western industries desiring to locate at Indianapolis would find advantages in looking up the former site of the Dean Steam Pump Works.

The White & Middleton Gas Engine Co., of Baltimore, Md., guarantee their engines to consume less gas than any other gas engine doing the same work. To enhance the guarantee and prove claims, the White & Middleton Gas Engine Co. are willing to set up free of expense and allow any responsible firm thirty days' trial to test the efficiency of their engines.

G. L. Stuebner & Co., of East Third street, Long Island City, N. Y., have issued a new illustrated catalogue and price list of their many specialties in sheet iron work, notably the self-dumping and self-righting steel and iron hoisting tubs for coal, iron ore or any bulk material. A special rotary dump car for coaling steamboats is a time saving and ingenious piece of mechanism which must recommend itself to all dock managers wherever a limited time is allowed for fueling. Judging from the sixty pages of cuts of all kinds of tubs, buckets and wheelbarrows used in loading or discharging vessels and for special dock use, the Struebner Co. are eminently in the field. We also notice that whereas G. L. Stuebner & Co. were formerly satisfied with a plant of 1,000 square feet, their manufacture has now become so extensive as to call for an area of works covering 35,000 square feet. Anyone requiring automatic dumping tubs or cars should correspond with the firm at Long Island City, N. Y.

The Racine Boat Manufacturing Co., Racine, Wis., have just issued a handsomely illustrated catalogue and price list of their steam, gas and electric launches, sailing yachts and boats specially designed for rowing, hunting, racing and cruising as well as canoes built for special purposes. We note an excellent departure from ordinary rules in the new catalogue in the system of classifying the style of boat desired. For instance, the model styled "Our Princess" has four grades or ratings, A A A being the highest class and grade B the lowest. A similar system of ratings in other classes follow. The seventy pages of illustrations and boat building data, with prices, is a brochure which all intending purchasers of small craft should have at hand.

Earl C. Bacon, engineer, late of the firm of Copeland & Bacon, has opened an office in the Havemeyer Building, New York, where he will handle Bacon's hoisting engines and winches.

The Pelham Machine Works, 416 West 26th street, New York, are constructing a great many Pelham hoisting engines for dock builders and contractors, containing Wern's patent friction drum.

POWER FOR LIGHTERS AND CANAL BOATS.

According to London *Fairplay* a new boat fitted with the screw propeller invented by Mr. H. Barcroft, of Newry, has just been tried on the Newry canal. The dimensions of the boat are 62 feet by 11 feet 6 inches by 6 feet 6 inches, and the carrying capacity 60 tons. On the trial trip with the boat empty the speed of five miles per hour was maintained. One of their great aims has been to turn out machinery so simple and strong that it can be put in charge of ordinary laborers. The propulsion is accomplished by a pair of screws, one on either side of the rudder, suspended overboard in a very simple and substantial manner; so much so that, when the boat was moving at full speed, the vibration of the machinery was scarcely perceptible. A peculiarity of this arrangement is the facility with which the propellers are to be lifted and lowered so as to suit the varying draught of the barge. When light the boat draws about 2 feet 6 inches, and the propeller is depressed so as to bring the bottom of the blades almost on a level with the keel, but when she is full the duaught becomes 5 feet 6 inches; the propellers are hen lifted up so as to have an immersion of about 3 feet 6 inches, the diameters being 4 feet 10 inches. The whole of the machinery can, if desired, be made portable so as to be lifted readily from one boat to another.

The coal consumed, costs, when the boat is going fully laden and at full speed, is about two cents per mile, driven with light-pressure engines, but if compound engines were employed this figure would be reduced by one-third. Experience has shown that no difficulty of any sort exists in the working of this machinery, and it seems thoroughly suited to canal work.

A drowning man, it is said, will grasp at a straw, but it is hard to tell what a drowning girl will grasp at. Sixteen year old Mary Ann Gallagher, of Baltimore, the other day fell over-board, and after swimming until she became exhausted, grasped a rock wholly under water, and held on to it, with her feet uppermost, until she was drowned.—*Marine Journal*, New York.

FOR COAST DEFENSES.

At the recent convention of the American Society of Civil Engineers, Niagara Falls, the president, Col. Wm. P. Craighill, U. S. A., delivered an interesting address on "Our National Defenses." He said:

When the civil war came on, our sea coast defenses were admitted to be as good as any in the world. In one great particular they were better than those of any other people—that was the Totten embrasure. In a casemated battery built for the defense of a great European port just before the introduction of the Totten embrasure here, the opening in the wall of the embrasure was 54 square feet, and the horizontal traverse of the gun was only 40 degrees. The Totten embrasure gave an opening of only 9 square feet, and gave a horizontal traverse of 60 degrees. The wall around the throat of this embrasure was strengthened by wrought iron a foot thick, inserted in the masonry, and lead concrete was also used as a most excellent material for resisting the impact of shot. Wrought iron shutters were added, which closed automatically, were thick enough to exclude grape shot and kept out the smoke of the discharge. This invention of Gen. Totten, who was then Chief of Engineers of the Army, is of historic interest as the first instance of the use of iron plating on land batteries. Some of these old forts are still of value, but not to be entirely depended upon for the defense of our harbors.

A very important part of our present system of defense consists of torpedos, but these must be under the fire of guns on land in order that the enemy can not remove or disable them. The light craft which would be used by a fleet for this purpose would be vulnerable to the fire of such guns as will still be accommodated in the Totten embrasure. Great ironclads must be met by the heaviest guns and mortars, mounted behind impenetrable, covered masses, and made as safe as possible by all the modern improvements, but it would be a waste of energy and money to fight the smaller craft with these largest guns.

Some historical incidents were introduced to show the value of small guns, to be used at comparatively short range, and to show the defensive power of forts of even moderate strength. The attack of the British on Baltimore in 1812, and the experiences of Fort Sumter during our war, were introduced for this purpose. Invulnerability is not to be aimed at in constructing land defenses, but relative vulnerability and endurance, and here the advantage will always be on the side of the defense; and guns of a given power can be mounted cheaper on land than on water, and will have the advantage in stability and accuracy of fire.

No armor has yet been produced that can properly be called invulnerable, and it is safe to say that none such ever will be produced; and, unless the decks of ships are as heavily plated as their sides, they will be penetrable by shells from rifled mortars, the accuracy of which has recently been greatly improved.

It is often said, and especially by people from the interior, who themselves are not directly subject to attack, that no enemy would undertake to land an army on our shores, as our militia would rise and drive the invaders into the ocean. It is true that our people are brave, and, under discipline and with experience, make as good soldiers as any in the world, but in attempting to prevent a descent upon the coast they could make no prolonged existence to the big guns of an invading fleet. The more the men who lined the shores, even with the best rifles and field artillery, the greater would be the slaughter. Some fixed defenses must be provided for our great cities and harbors. Reliance upon torpedoes alone is mistaken, for torpedoes may be taken up as easily as they can be put down, unless they are placed under fire from the shore—that is, they are only an adjunct to defense. Neither is it the best economy to mount our guns for harbor defense solely upon ships. This would require at every point to be defended a fleet as strong as the enemy could be expected to bring against it, and the first cost of mounting guns on shore is far less than putting them on ships, and the life of shore fortifications is longer than the life of ships. It would take a navy greater than that of all the other nations of the world combined to defend the immense coast line of the United States.

In 1816 the Board of Engineers laid down the following principles for the defense of our coast:

1. They must close all important harbors against an enemy, and secure them to our military and commercial marine.

2. They must deprive an enemy of all strong positions, where, protected by naval superiority, he might fix permanent quarters in our territory, maintain himself during the war, and keep the whole frontier in perpetual alarm.

3. They must cover the great cities from attack.

4. They must prevent, as far as practicable, the great avenues of interior navigation from being blockaded at their entrance into the ocean.

5. They must cover the coastwise and interior navigation, by closing the harbors and the several inlets from the sea which intersect the lines of communication, and thereby further aid the navy in protecting the navigation of the country.

6. They must protect the great naval establishments.

These principles are fundamental, and have stood the test of argument and experience, but the means of carrying the principles out have changed, and now it is necessary to concentrate at the points to be defended armaments equal in weight and metal to those of any possible attacking fleet, supplemented by torpedo defense.

Another important element in our defensive system is the ship canal, and an interior line of waterway, parallel to the Atlantic and Gulf coasts, is of great importance. It would be useful in peace, and in time of war its advantage to our naval and merchant marine would be incalculable. For instance, a ship canal connecting the great bays of the Chesapeake and the Delaware would enable a single fleet to be prepared to promptly meet an enemy threatening either of these waters. A great canal should connect the lakes with the Mississippi, and the Erie canal should be made wider and deeper; but most important of all is a canal across the Isthmus, between the Atlantic and Pacific coasts. The immense commercial and military advantages to be gained from the building of such a canal should be controlled by the United States, and it is certain that the Nicaragua canal will be opened before many years have passed, if not by the United States, by England or by Germany.

NEW TONNAGE BUILT.

Vessels built in the United States and officially numbered as shown by the records of the Bureau of Navigation, Treasury Department, during the quarter ended June 30, 1894 are as follows:

	Steel.		Steam.		Sail.
	No.	Gross Tons.	No.	Gross Tons.	
Atlantic and Gulf	6	8,709.35		None	
Pacific				"	
Great Lakes	6	10,155.84		"	
Western Rivers	3	170.17		"	
Total	15	19,035 36			
Iron.					
Atlantic and Gulf	3	1,819.20		"	
Pacific				"	
Great Lakes				"	
Western Rivers				"	
Total	3	1,819.20			
Wood.					
Atlantic and Gulf	39	5,181.52	166	9,977.45	
Pacific	6	1,984.00	23	567,86	
Great Lakes	26	5,881.84	10	2,992.72	
Western Rivers	16	1,163.33			
Total	87	14,210.69	199	13,438.03	

	No.	Gross Tons.
Total Steam	105	35,065.25
Total Sail	199	13,438.03
Grand Total	304	48,503.28

Previous Quarter.

Total Steam	No. 59	Tons, 13,739.63
Total Sail	No. 61	Tons, 7,126.19

NOTICE TO MARINERS.

United States of America—Northern Lakes and Rivers—Michigan.

Mamajuda Range (Front) Light-Station.—Notice is hereby given that on or about July 16, 1894, a fixed red lens-lantern light will be established in the structure recently erected on Mamajuda Shoal, in about 3½ feet of water, about 600 feet N. 8° 13′ E. (N. ¾ E.) from Mamajuda Light, Detroit River, Michigan.

The focal plane of the light will be 28 feet above the mean level of the river. The light will illuminate 120° of the horizon lying between N. 81° 47′ W. (W. ¾ N.) and S. 21° 47′ E. (S. by E. ⅞ E.), or 90° to the eastward and 30° to the westward of the range line.

With Mamajuda Light as a rear light, the light forms a range to mark the line of best water passing about 950 feet to the eastward of Grassy Island Light (about 350 feet to the eastward of the curve of 18 feet depth abreast of Grassy Island Light) to a point about ¾ mile from the new light.

The structure is a white, square, pyramidal tower on a platform supported on piles, and is surmounted by an octagonal lantern.

Bearings are true; distance is in statute miles.

By order of the Light-House Board.

United States of America—Northern Lakes and Rivers—Michigan.

Muskegon Pierhead (Front) Light-Station.—Notice is hereby given that on or about July 25, 1894, Muskegon Pierhead (front) Light (fixed red) will be moved 323 feet nearer the outer end of the S. pier at the entrance to Muskegon Harbor, E. side of Lake Michigan, Michigan, and exhibited from a lantern in the inclosed glazed end of an elevated conduit extending shoreward 580 feet to the Pierhead Light-Tower. The distance between the lights will then be about 58 6 feet, and the lights will, as heretofore, form a range for approaching the harbor, the range line approximating the line of direction of the outer end of the S. pier.

The focal plane of the light will be 25 feet above the mean level of the lake.

By order of the Light-House Board.

United States of America—Northern Lakes and Rivers—Michigan.

Grosse Isle Upper Range Light-Station.—Notice is hereby given that on or about July 16, 1894, a fixed white lens-lantern light will be established in each of the two structures recently erected on the E. side of Grosse Isle, nearly abreast of the S. end of Fighting Island, Detroit River, Michigan.

Each light will illuminate 90° of the horizon lying between S. 72° 03′ W. (WSW. ⅜ W.) and S. 17° 57′ E. (S. by E. ⅝ E.) or 60° to the eastward and 30° to the westward of the range line.

The range line will mark the line of best water from its intersection with the line of Grosse Isle Lower Range up the river to a point from which Mamajuda Range (front) Light will become visible, and bear N. 81° 47′ W. (W. ¾ N.). The range line passes about 750 feet to the eastward of Mamajuda Light (about 350 feet to the eastward of the curve of 18 feet depth abreast of that light).

Each structure is a square pyramidal open framework of wood, painted brown, with a small white house, with red roof, in its base, and is surmounted by a white octagonal lantern with a black roof.

The focal plane of the front light will be 45 feet above the mean level of the river, and the structure from which the light will be shown stands on a platform on piles, in about 3½ feet of water, about 175 feet from the easterly shore line of the island, and about 1,350 feet N. 12° 03′ E. (N. by E. ⅛ E.) from the rear light.

The focal plane of the rear light will be 75 feet above the mean level of the river, and the structure from which the light will be shown stands about 450 feet to westward from the easterly shore line of the island, and its lower part is obscured by trees.

The approximate geographical position of the rear light, as taken from the Chart of Detroit River of the Survey of the Northern and Northwestern Lakes, will be: Latitude, North, 42° 09′ (50″); longitude, West, 83° 08′ (26″). Bearings are true.

By order of the Light-House Board.

United States of America—Northern Lakas and Rivers—Ohio.

Maumee Bay Ranges Light-Station.—Notice is hereby given that on or about July 20, 1894, modifications, as follows, will be made in the three lights of the Maumee Bay Ranges, marking the South and Long reaches of the dredged channels in Maumee Bay, Ohio.

The intensity of each of the three lights will be increased by the substitution of new illuminating apparatus for that now in use.

Maumee Bay (front for both) Light will show a fixed white lens-lantern light illuminating the entire horizon.

Maumee Bay (E.) Light will show a fixed white lens-lantern light to the south-westward up the dredged channel, as heretofore, and, in addition, in the direction of the outer end of the new Straight Channel over an arc of about 50° lying between S. 33° W. (SW. by S.) and S. 83° W. (W. ⅝ S.), the entrance to the channel lying about midway between these bearings, or on the bearing S. 58° 15′ W. (SW. by W. ⅛ W.).

Maumee Bay (S.) Light will show a fixed white lantern light.

The lights will continue to serve as guides in the same channels as heretofore. Bearings are true.

By order of the Light-House Board.

James A. Greer,
Rear-Admiral, U. S. Navy, Chairman.

Office of the Light-House Board, Washington, D. C., July 16, 1894.

TAXATION OF OHIO VESSEL PROPERTY.

The Cleveland Chamber of Commerce committees on taxation and navigation held a joint meeting last week to discuss the communication recently sent out by Commissioner of Navigation Eugene T. Chamberlain, in which he pointed out the great excess of vessel taxation in Cleveland over other ports in proportion to the enrolled tonnage and valuation. As the communication comes from an official source, the committees thought it should be brought before the board of equalization Capt. C. E. Benham and Messrs. H. D. Goulder, L. A. Stone, J. J. Sullivan and H. A. Bishop were appointed a committee to lay it before the board. Neighboring states are also expected to take action in the matter.

Lake built vessels to which official numbers were assigned by the Bureau of Navigation during the week ending July 7, are as follows: Steam—Nicaragua, 1202 tons, Port Huron, Mich., built at W. Bay City; Morning Star, 80 tons, Grand Haven, Mich.; Rainbow, 16 tons, Erie, Pa.; Elsa M., 14 tons, Milwaukee, Wis.

MARITIME LAW.

CROOKS et al. v. SHIP DUNBRITTON.

United States District Court, Southern District of New York.

CARRIERS—DAMAGE TO CARGO—SHIPMENT OF OIL AND PLUMBAGO—PERILS OF THE SEA—BURDEN OF PROOF. The ship Dunbritton loaded certain barrels of plumbago at Ceylon and stowed them in the lower hold; pipes of oil were afterwards stowed in the between decks. The shipment of oil and plumbago in the same vessel is customary; the shippers of the cargo other than oil knew that oil was to be taken aboard; the deck upon which this oil was stowed was especially strong, tight and secure, and the court found, as matter of fact, that the cargo was well stowed and dunnaged. Near Cape Horn the ship experienced very bad weather, and on one occasion shipped a heavy sea; and by reason of this heavy weather, and without any fault of the ship, there was much leakage from the oil. On arrival at New York some of the plumbago and other goods were found to be damaged by the oil, to recover which damage this libel was filed. Held, That the damage having occurred by reason of perils of the seas, the burden of proof was upon the shippers to show some fault in the ship in not protecting the goods against such damage; and as, on the evidence, the shippers had failed to show such fault by any preponderance of proof, they could not recover.

Brown, District Judge.

HOFFMAN v. THE NEBRASKA.

District Court, N. D. Illinois. April 30, 1894.

1. MARITIME LIENS—REPAIRS AND SUPPLIES—STATE STATUTES. Where an Illinois vessel is taken to a Wisconsin port to be altered and refitted, there being no necessity for doing the work at that particular port, no maritime lien arises therefor, since such liens are founded on necessity; but the contractor has a lien under the Wisconsin statute, which gives liens to the builders and repairers of water craft.

2. SAME—WAIVER—MORTGAGE. A lien for repairs created by state law is not lost by taking a note and mortgage on the vessel, where the note expressly states that it is not given or accepted in lieu or as a waiver of the lien.

3. SAME—PRIORITIES. Liens for repairs and for supplies, one created by the statute of the home port, and the other by that of another state, are entitled to equal rank.

4. SAME—SUPPLIES FURNISHED TO MARSHAL. A lien for fuel furnished to a steamboat while in the custody of the marshal should be allowed only in case the net earnings of the boat add to the funds in his hands for distribution, and only to the extent of his proportionate share in such distribution.

Grosscup, District Judge.

The propeller Nebraska has been sold by the action of this court, and the money is now waiting in court for distribution. There is no claim for seamen's wages, unless it be that of the master, and the fund is to be distributed among the different parties who are otherwise entitled to liens thereon. Unfortunately, it is insufficient to pay all the claimants in full; hence the contest respecting the rank and dignity of the claims. The evidence shows that in view of the World's Fair, and the probability of a large passenger traffic between Chicago and Jackson Park, the owner of the steamer, one Cummings, then residing in Chicago, took her to Milwaukee, and put her in the dry docks of the Milwaukee Dry Dock Co., under a contract with that company to refit her in such a way as would make her temporarily adapted to the carriage of passengers. The cost of the refitting amounted to upwards of $14,000, which alone shows that it must have been very extensive and thorough. It consisted of the taking out of her old engines, and their replacement, and such readjustment and reconstruction of the decks as would adapt them to passenger traffic. The statutes of Wisconsin, like those of Illinois, provide that the builder or repairer of water craft shall have, under certain conditions, liens for the materials furnished and services rendered thereon, and I think the understanding and dealings between the owner and the dry dock company were such as, against the owner, would give the dry dock company a lien under that statute. Subsequently, notes for the amount owing to the company were executed by the owner, with a mortgage upon the vessel securing them, which was duly filed in the proper register; but these notes on their face provide that they are not given or accepted in lieu, or as a waiver, of the lien. There can be no question that, as between the owner and the dry dock company this latter transaction would not defeat the company's lien. After being refitted, the vessel navigated the water of the lakes, and obtained credit for supplies, the claims for which are now before the court for adjudication.

The principal and most important question relates to the character of the dry dock company's lien. Maritime liens proper are the creation of the law to make navigation possible. They rose in a day when the high seas were the pathway for vessels, and when the nations in whose ports the vessels anchored were much more strangers to each other than they are to-day. The craft of a nation in a foreign port had no credit, except itself, upon which to obtain the repairs or supplies that were necessary to take it home. The necessity of maintaining that credit inviolate caused the courts of the home port to enforce the pledge of the vessel, even to the point of discrimination against the other claimants, except salvage and seamen. It was the only method by which vessels away from home could obtain wings to fly the seas. On this necessity grew up the doctrine of maritime liens proper. The considerations of necessity upon which the lien is based do not exist in favor of the claimants of the dry dock company. The refitting was not made to give the steamer wings or legs with which to reach her home port. There is no element of stress or necessity in the repairs it provided. The owner could have had the repairs made at any other port as well as at Milwaukee, and he chose that port, not under the stress of an emergency, or to enable his vessel to get home, but simply because, for some reason, it suited his purpose better to have the repairs made there than elsewhere. No reason has been shown—no reason can be thought of—why the old maritime lien, brought into existence for an emergency, should be applied to this case. I am of the opinion, however, that the Milwaukee Dry Dock Co. had, under the statutes of Wisconsin, a lien upon the vessel for the value of such repairs, and that this lien was not waived or set aside by the subsequent transactions between the parties. It is evident that, as between themselves, it was not waived, for every precaution was taken to prevent such an inference. The notes and mortgages, subsequently taken, expressly incorporated the intention of the parties that the lien should continue to subsist, and the fact of the lien itself, and of the intentions of the parties respectively thereto, have always been open to the inspection of those asked for supplies, upon the proper records of the port. This lien, however, under the doctrine of the Rumbell Case, 148 U. S. 1, 13 Sup. Ct. 498, comes from the same parentage as the lien of the claimants in the home port, namely, the statutes of the respective states, and is therefore, in the absence of any maritime reason for preferment or subordination, of equal rank therewith. I see no reason in this case why the claimants of the home port or of the Milwaukee Dry Dock Co. should outrank each other. They both contributed to the money earning capacity of the craft. They both were necessary to put and keep the vessel afloat, and neither would have existence as liens except for the legislation of the respective states. In the distribution, therefore, they will be regarded as of equal rank.

I am not prepared to change, *ex post facto*, the rule that has formerly governed the courts of this district in the recognition of liens. All supplies that have been furnished from the home port within the last two seasons will be regarded as of equal rank. Neither will I, in its application to this case, change the rule respecting the rank of home and foreign liens. I have, however, submitted these two matters to the consideration of Judges Seaman, Jenkins and Bunn, within whose jurisdiction the ports of the lake lie, and will make some announcement thereon within a short period.

I can see no reason why an exception should be made in favor of the master in this case, and his claim for services will therefore be disallowed. The claim of the fuel company for fuel, supplied while the boat was in the custody of the marshal, will be allowed only in case the net earnings of the boat added something to the fund now in his hands for distribution, and only to the extent of his proportionate share in such distribution.

The question of how far separate libels are required to properly protect the interests of claimants whose claims were in the hands of one proctor will be submitted to the master for a finding, with instructions to the master that it is the duty of the party representing many claims to so reasonably consolidate them as will fully protect the interest of each claim. Under the foregoing directions the cause will be referred to the master for such further proceedings as are necessary to determine the pro rata amount of each claim.—*Fed. Rep., Vol.* 61, *No.* 5.

FORCE OF A CANNON-BALL.

In dwelling upon the wonderful power of the guns of the Indiana, Albert Franklin Matthews, in an article on "The Evolution of a Battleship" in the *Century* for July, gives illustrations from the recent Chilean civil war, showing the effectiveness of the smaller sizes of breech-loading rifle guns.

A shot weighing 250 pounds from an 8-inch gun of Fort Valdivia in Valparaiso harbor struck the cruiser Blanco Encalada above the armor-belt, passed through the thin steel plate on the side, went through the captain's cabin, took the pillow from under his head, dropped his head on the mattress with a thump, but without injuring a hair, passed through the open door into the mess room, where it struck the floor, and then glanced to the ceiling. Then it went through a wooden bulkhead one inch thick into a room 25x42 feet, where 40 men were sleeping in hammocks. It killed six of them outright, and wounded six others, three of whom died, after which it passed through a steel bulkhead five inches thick, and ended its course by striking a battery outside, in which it made a dent nearly two inches deep. It was filled with sand. Had it released deadly gases no one knows what damage it might have done.

A 450-pound missile from a 10-inch gun in the same fort struck the same vessel on its 8-inch armor. It hit square on a bolt. The shell did not pierce the armor, but burst outside the vessel. It drove the bolt clear through, and in its flight the bolt struck an 8-inch gun, completely disabling it. Such is the power of the small-sized guns.

INTERNATIONAL CONFERENCE ON INLAND NAVIGATION.

The Sixth International Congress on Inland Navigation will be held at the Hague, Holland, on the 22d inst. This Congress held its first session at Brussels in 1885, and in the following year it met in Vienna. In 1888 the meeting was held at Frankfort-on-Main; in 1890 it was in Manchester and in 1892 at Paris.

The object of the gathering is the discussion of questions in general order relating to the navigation of rivers and canals. The session will be composed of general meetings, meetings of sections and excursions. The questions dealt with are to be first examined in the sectional meetings and afterwards discussed in the general meetings. The work will be divided into four sections. First, The subject of the construction and maintenance of canals and harbors; Second, The technical treatment of the same; Third, The commercial treatment, and, Fourth, The question of navigable rivers and their improvement.

With regard to the construction and maintenance of canals, two questions will be first considered: "Construction of navigable canals affording operation at high speed" and Forms and dimensions of the canal section which will permit a boat of a given immersed section to attain a desired speed with the least tractional effort." There will also be considered in this connection the following subjects: Necessary excess depth of the canal over draught of boats, minimum radius to be adopted for canal curves, the most efficacious disposi tion and most economical construction for the protection of slopes of canals. The second question in this section deals with "Plant of Ports of Navigation."

In the second section, under the heading "Technical Treatment," there are two questions on the programme. First, The means of preventing ice blockades, and second, the question of traction and propulsion upon canals, and canalized rivers and rivers of natural flow. With regard to ice blockades it is a fact that the closing of navigation caused by ice has for a long time been considered as something against which it is idle to contend. Of late years, however, experiments have been made to overcome this obstacle to navigation, and the results of these experiments will be given at the conference.

The only subject entered for debate in the third section is "Tolls on Navigable Waterways." Tolls exist in most countries and the rates in force in different countries are said to be not based rationally. Statistics will be presented on the following points: Rates of tolls, influence of mileage, of tonnage of boats, of the nature, value and quantity of the goods transported, of tolls on empty boats, etc.

The fourth section, which takes up navigable rivers and their improvement, will consider the question of the redations between the configuration of rivers and the depths of their channels. It is proposed to deal with this subject according to the following programme: Comparative study of the forms and depths of the principal water courses, with tides and without.

The last subject to be discussed will be "The Regulation of Rivers at Low Water." The influence exerted upon the current of a river by continuous longitudinal dykes constructed so that at low water they enclose the entire river and remain slightly submerged, will be considered.

There will also be excursions to principal points of marine interest in the Netherlands.

ENGLISH DEMAND FOR AMERICAN CAPSTANS.

The American Ship Windlass Co., of Providence, R. I., have just received a cable order from their agents at Liverpool for one No. 000 iron yacht crank capstan, galvanized, for a yacht building near Liverpool. Later they received another cable from these agents ordering one No. 000 bronze yacht crank capstan and two No. D bar power capstans for a yacht and a sailing vessel respectively.

It will thus be seen that the orders for these capstans continue to come from Great Britain and with increasing frequency.

Messrs. G. T. Soley & Co., the Liverpool agents of the American Ship Windlass Co., in writing to that company on the 13th of June, conclude their letter as follows: "One by one, all our leading ship owners are recognizing the merits of your windlasses and capstans."

THE MARINE RECORD

ESTABLISHED 1878.

PUBLISHED EVERY THURSDAY, AT 144 SUPERIOR ST., (LEADER BUILDING), CLEVELAND, O.

IRVING B. SMITH, CAPT. JOHN SWAINSON, . . . PROPRIETORS

BRANCH OFFICE:

CHICAGO, ILL., ... 179 LaSalle Ave.

THOMAS WILLIAMS, Associate Editor.

SUBSCRIPTION.

One copy, one year, postage paid, . . . $2 00
One copy, one year, to foreign countries, . . $3 00
Invariably in advance.

ADVERTISING.

Rates given on application.

Entered at Cleveland Post Office as Second-class Mail Matter.

CLEVELAND, O., JULY 19, 1894.

THE report telegraphed from Chicago that the Minnesota Steamship Co. had placed an order for two large steel schooners is not only premature but rather wide of the mark as such a contract is only under consideration. That some large metal tow barges will be built for lake trade in the future there can be no two opinions, but the owners referred to above have no immediate intention of building.

THE Vigilant at last wins a race against the Britannia. That the forestay of the English yacht carried away during the spin is no excuse for the defeat, as the race was won by the Vigilant before that casualty happened. Heretofore it was thought that the English yachts did their best work with a strong breeze and a lumpy sea, but it was in just such weather that the Vigilant scored one out of eight races, some of the former being merely drifting matches.

THE tariff conference committee at Washington is still dallying with the anticipated tariff changes and keeping the country in a state of commercial disturbance. The fact that so little is learned regarding the action of the tariff committee concentrates the uneasy feeling and affects every business as well as all portions of the country. The coming week ought to develop the intended action of Congress in this matter, even if only in a partial degree, and the sooner definite steps are taken the better it will be for every one.

THE United States triple screw cruiser Minneapolis is the "Queen of the Seas", having reached the phenomenal speed of 25.42 miles an hour on an eight mile run and maintained an average speed of 23.05 miles over the trial trip course. The displacement of the Minneapolis is 7,350 tons and some idea of the immense force exerted to propel so larfe a body through the water at railroad speed may be gained from the statement that her triple expansion engines indicated 21,000 horse power at 129 revolutions per minute with a consumption of about nineteen tons of fuel per hour.

IT is gratifying to note that the prospects of business are again beginning to loom up with the settlement of labor troubles and there is every indication of a brisk fall trade throughout the country. In the matter of freights paid for lake transportation it is to be hoped that vessel owners and managers will not rush in tonnage at ruinously low rates to themselves and thereby end a poor season poorer than when it opened up. A trifle more unanimity of interests and interchange of business propositions would redound to the welfare of the entire community, besides there is no reason in taking unlimited financial risks.

THE July bulletin of recent changes in Aids to Navigation, in so far as errors and corrections are concerned, is not a whit ahead of the last issue of the publication. In correcting a bearing of Kewaunee Pierhead Light, as recently published broadcast, the bulletin notes that a S. W. by W. ⅝ W. bearing should read S. by W. ⅝ W. The omission of a letter makes a handful of points difference in the above bearing. Again, the bearing of St. Helena Light from McGulpin's Point Light Station is given as N. 42° 10′ E. and to further elucidate the bearings, as given in degrees, it is quoted in points as being N. W. ⅛ N. There is no reason why these errors should be contiually sent out by the Light-House Board. The "Notice to Mariners" are valuable when accurate only, and we trust that in the future someone who can box the compass will be given the duty of making corrections before the notices are issued.

MARINE ENGINEERS AND RAILWAY ENGINEERS.

Under the above caption, and anent the recent labor troubles, the New York *Marine Journal*, unusually clear, right and pertinent on all matters affecting the marine interests and transportation, has the following to say in its latest issue:

"The incident of the disastrous railway strikes in the West, and the contrasting smoothness with which all lines of steam vessels are maintained, affords a lesson and points a remedy. When it was called to the attention to Gen. Dumont, supervising inspector general of steam vessels, at Washington, the other day, that a tie-up of all the steamers on the lakes was proposed by the marine engineers in sympathy with their railroad brethren, he said he thought not, for the law had established a very good safeguard against all that sort of thing in the fact that marine engineers are officers of the United States, and each engineer, when he receives his license, takes an oath 'that he will faithfully and honestly, according to his best skill and judgment, without concealment or reservation, perform all the duties of him required by law' (Section 4445, R. S.)

Gen. Dumont also called attention to sections 4449 and 4450 of the Revised Statutes, which provide that: 'If any licensed officer shall, to the hindrance of commerce, wrongfully or unreasonably refuse to serve in his official capacity on any steamer, as authorized by his certificate of license, or shall fail to deliver to the applicant for such service at the time of such refusal, if the same shall be demanded, a statement in writing assigning good and sufficient reasons therefor, his license shall be revoked, upon the same proceedings as are provided in other cases of revocation of such licenses.' Likewise to section 4463 of the law, which has always been liberally construed, and provides that if a steam vessel on her voyage is deprived of the services of any licensed officer without the consent of the master, owner or any person interested in the vessel, the deficiency may be temporarily supplied until others licensed can be obtained.

Gen. Dumont's loyalty to the service he represents, and to the United States of America, irrespective of whom he runs counter to, has made him an occasional enemy, but even these cannot but admire his nerve in the line of his duty, and in substantiation of any statement he may make that may seem hardly credible, he can always find a section of a statute to back up his opinion. He seldom, if ever, is in error on any question of importance in connection with his bureau.

There is no doubt that the mere existence of these laws has prevented the less responsible marine engineers from striking in the past, as was instanced when the marine engineers of the lower Mississippi refrained from joining the great labor strike at New Orleans a few years ago, and it will doubtless have the same effect upon the lakes in the present crisis and on all future occasions, for in case of the failure of the engineers to observe the laws, the administrative officers of the inspection service have no option but to enforce the penalties for their non-observance. If railway engineers were similarly licensed and brought under the control of the federal authories, such strikes and interference with commerce as the past couple of weeks have witnessed in our Western States would be practically impossible."

The application of the foregoing is, however, entirely erroneous, as the liberty of the subject would thus be subjugated under the Revised Statutes so glibly quoted, whereas, common law and practice are eminently in contradistinction to the inferences thus negligently foreshadowed. An individual, many forming an aggregation, is justified in working or idling, hindrance of commerce to the contrary notwithstanding. The entire argument relative to the reading, sense or principle of the Revised Statutes quoted above is therefore misleading in the extreme, and only courts the exercise of the risible faculty among licensed marine engineers as well other licensed officers.

The holder of a license, gained after a voluntary examination, is not held in leading strings by the terms under which the license was granted. It is simply a matter of determining qualification and skill, and ends there in so far as the steamboat inspection service is concerned. Of course, no licensed officer or any one else on shipboard is entitled to quit work during a trip, passage or voyage. Such a proceeding would mean mutiny, and, as their civil contract binds them to perform a certain service, they must live up to their agreement, unless it is mutually dissolved. It is radically wrong, however, to place any such construction on the issue of licenses as our contemporary seems to convey. The civil agreement alone is binding, and, in the absence of such, a licensed man can obey the dictates of his own will when a vessel is in port, and that too without going through the form of a divorce by filing a statement in writing of the causes for his desiring to make a change at the expiration of his agreement to serve in his warranted capacity. Therefore, there is neither pith, point or accuracy in the construction which is placed on the sections of the Revised Statutes as quoted. An officer, after passing a voluntary examination, is given a license, after which he can either work or play, and if the head of the steamboat inspection service flatters himself that he holds the action of licensed officers "in the hollow of his hand," he is more greatly misled than we could have believed.

DEEPEN THE OLD LOCK.

THE Sault Ste. Marie *News*, evidently alert to the best interests of Lake Superior commerce, calls attention to the deepening of the present lock and says:

It is high time for vessel owners, commercial associations and others who are vitally interested in the navigation of the great lakes and their connecting rivers, to begin to consider what should be done with the present lock, when the new one under construction and rapidly nearing completion, is finished. The new lock will be inadequate to start with. The first thought of all will be that both locks can be used. True, they can be, but not until the present lock is deepened. This should be done for many reasons, just as soon as the new lock can be used. When the new lock is put in service vessels will at once begin to load as much deeper as it will allow. This being true, and it undoubtedly is, of what use will the present lock, with 15 feet of water seldom over the mitre sill, be to the carriers? It will be of no use until it is deepened. There is more than the inadequacy of the new lock to demand the deepening of the present one. Suppose a break should occur. If it be a serious one the disastrous consequences are not to be easily measured. The break of four years ago is fresh in the minds of all and that break was trivial, in comparison with what might have happened. A short time ago a vessel carried away two pairs of gates at the Welland canal. This same occurrence might transpire here. Then what? Why, the present lock should be deepened and ready to act not only as an assistant, but as an auxiliary. Great good fortune has attended the operation of the present lock and it speaks volumes for the care and efficiency of those who have had it in charge. Since its opening more than 107,000 vessels, of all sizes and kinds, have passed through. And yet not one serious accident is chargeable to this wonderful fleet. Four years ago a valve in which there turned out to be a flaw gave out and that is the only serious delay that has ever occurred. Such good fortune is highly desirable, but cannot always be depended upon. This is the time to call attention to this matter. The deepening of the present lock cannot be agitated too soon now. It must be done.

The canal is the key to the transportation carried on with the north-west, and although the Canadian canal will soon be opened, the American gateway ought to be made adequate for all of our own trade.

THE new United States cruiser Minneapolis, which made her official trial trip in Massachusetts Bay on Saturday last, has beaten the record of her sister ship, the Columbia, but not by so large a margin as was claimed in advance of her official trial trip. Although it has been proved beyond cavil that it takes quite a year to get the best work out of such ponderous machinery as the record breakers in ocean speeds are fitted with, the Minneapolis made a continuous run of more than four hours, and has established a record of more than twenty-three knots an hour. The exact official figures will be given out later, but the estimate of the United States Trial Board is that she made an average speed of 23 05 knots an hour over a course eighty-four knots in length. Just what the record will be when the tides are taken into account remains to be computed upon the data furnished the board by the assistants who were on the eight different Government vessels stationed along the course from Cape Ann, Mass., to Cape Porpoise, Me. Like her sister ship, the Minneapolis also made a short run between two buoys at the rate of 25.20 knots an hour. Just what the conditions are which could lead to this result do not appear, but in such a run she was probably favored with a strong tide and other natural as well as mechanical advantages.

THE new Hay Lake Channel is now nearly completed and will be officially opened for traffic in a few days, or as soon as the Secretary of War notifies Gen. O. M. Poe. Several steamers are already using the passage and pronounce it much safer than the old channel.

STUDYING LAKE CURRENTS.

Prof. Mark W. Harrington, Chief of the United States Weather Bureau, is on his way to Duluth, and from that point will commence a six-week's exploration of the north shore of Lake Superior to study the lake currents and complete the charts that show the same. He is accompanied by Mr. Norman B. Conger, who has charge of that part of the work in the Lake Marine district of the Weather Bureau.

STAGE OF WATER AT ST. MARY'S FALLS CANAL.

DEPARTMENT OF AGRICULTURE, WEATHER BUREAU.

Depth of water at the St. Mary's Falls Canal for the week ending July 19, 1894:

July	12	8 a. m.,	15	feet	0	inches.	8 p. m.,	15	feet	2 inches.
"	13	"	15	"	2	"	"	15	"	1 "
"	14	"	15	"	1	"	"	15	"	2 "
"	15	"	15	"	0	"	"	15	"	2 "
"	16	"	15	"	0	"	"	15	"	1 "
"	17	"	15	"	0	"	"	15	"	0 "
"	18	"	15	"	0	"	"	15	"	1 "
"	19	"	15	"	0	"	"			

LAKE FREIGHTS.

Ore rates are unchanged, although a little more inquiry for tonnage has prevailed during the last day or two. The figures now quoted are: 60 cents from the head of Lake Superior, 50 cents from Marquette and 40 cents from Escanaba. Ohio coal rates have dropped 5 cents to Milwaukee, charters being placed at 40 cents; Lake Superior and Escanaba, 35 cents. Chicago grain rates have been quoted all week at ⅞ cent per bushel on wheat to Buffalo, and Kingston rates dropped from 2¼ to 2⅛ cents; Port Huron, corn at 1 cent.

MISSOURI RIVER DRYING UP.

The recent survey of the Missouri river under the direction of the United States Geographical Engineering Department resulted in a discovery that the stream is undergoing a peculiar transformation. During the survey measurements were made of the volume of water passing between the banks at various points from Great Falls, Mont., to Sioux City. It was found that the volume of water passing between the banks at Great Falls was 4,796 cubic feet per second, while at Fort Benton, 25 miles farther down the river, the volume was but 4,331 cubic feet, a decrease of 465 cubic feet.

Owing to the large number of tributaries emptying into the river between Fort Benton and Sioux City, a gradual increase was noted, until at the latter point, where the final measurement was taken, a flow of 14,776 cubic feet per second was reached. In the opinion of some of the engineers engaged in the survey, the decrease in the volume between Great Falls and Fort Benton explains the presence of that great subterranean body of water known as the South Dakota artesian basin. The discrepancy can only be accounted for by the presence of an outlet in the bed of the river somewhere between the points mentioned.

Directly below the upper cataract, on the south bank of the river, about half way between the towns, is a large pool, in which, if frequent visitors to the place can be believed, are to be found eyeless fish of the species said to inhabit subterranean water courses. In all probability the outlet, if one exists, is located at this point, the alleged presence of these fish tending to corroborate the theory. From here, if this surmise is correct, it would appear that an underground channel running in a southeasterly direction carries the water into a basin underlying a large area of South Dakota, thus forming a hugh subterranean lake, which has recently been tapped by the numerous artesian wells.

Another queer discovery is noted in connection with the survey just completed. In 1878 observations were taken in a similar manner, and, unless errors in calculation have been made, since that year there has been a decrease of fully 20 per cent. in the volume of water in the river. If no error has been made and the ratio of of decrease continues, before 50 years have passed the once majestic Missouri will have dwindled into an insignificant rivulet.

DELIVERY OF SHIP IN RELATION TO TRANSFER OF RISK TO PURCHASERS.

A recent case tried in the British courts relative to the delivery of new tonnage to the owners, is stated as follows: A ship was built under a contract which stipulated that the price of it was to be paid in four instalments, the last to be paid when the ship was delivered and the builder's certificate handed over. As she was constructed, the vessel was to become the property of the purchasers. It was further agreed that she was to be delivered ready for sea and when delivered a model and certain certificates were to be furnished, but she was to remain at the builder's risk until handed over to the buyers, and until then the builders were to keep her insured. One of the owners, expressed a wish to have the ship re-transferred to a berth, and on the builders stating their unwillingness to incur the risk of another move, an arrangement was made to have the ship delivered and the removal made at the risk of her owners. The last instalment of the price was paid, the ship was insured by the purchasers in their names and the certificates of the builders was handed to them, but the model, etc., was not supplied, and previous to the removal the ship was capsized by a sudden squall. On that day a part owner cabled to America for instructions and the next day entered his protest as to this accident, and agreed for the hire of a salvage plant with the British Marine Salvage Co., Limited. Afterwards acting on legal advice he assumed the position of not having taken the delivery of the ship. The Court of Session of Scotland decided that delivery had been taken so as to transfer the risk of the purchasers, although the ship had not been moved and was not ready for sea.

REPORT OF CHICAGO CUSTOMS OFFICE.

Collector of Customs Russell of Chicago has prepared a report for the Treasury Department, showing the total receipts of the Chicago custom house for the fiscal year which ended June 30. The report shows a large falling off in the receipts from customs duties as compared with the year 1893.

The total receipts were $5,897,786.80 and the expenses of the office $604,796.18, making the net receipts $5,294,990.62. The receipts for 1893 were $8,510,342.50, the decrease being about $2,500,000. The large receipts of 1893 were owing in a great measure to the World's Fair, but during the last six months the tariff agitation has had the effect of reducing the imports very materially. The importers have been holding back and bringing in no more goods than was absolutely necessary to fill orders, in the hope that lower duties would be in force soon. Chief Deputy Hitt said that the receipts at the present time are at the lowest notch and this condition will prevail until the new tariff bill is passed.

There was a falling-off also in the number of vessels entering and clearing from this port. The report as to the movements of vessels is as follows:

Entered from foreign ports	90
Cleared for foreign ports	304
Entered from domestic ports	8,203
Cleared for domestic ports	8,137

The arrivals and clearances for 1893 were as follows:

Entered from foreign ports	145
Cleared for foreign ports	367
Entered from domestic ports	9,794
Cleared for domestic ports	9,609

The total value of the exports which went through the Chicago custom house during the last year was $3,560,295.

A NEW VALKYRIE.

The report which has been in circulation for several weeks past that Lord Dunraven and two or three other gentlemen have agreed to build another Valkyrie, and that they will challenge for the America's cup in 1895, is confirmed. The *Field* says that the new Valkyrie will probably be much smaller than the sunken Valkyrie.

A SHINING LIGHT.

The "masthead light" that sheds a ray over the marine notes of the Detroit *Free Press*, takes THE RECORD to task for a typographical error wherein the Duluth Dry Dock Co. read instead of the Detroit Dry Dock Co. The next day this shining light informs the *Free Press* readers: "It is announced that a steamer 230 feet over all, 35 feet beam and 12½ feet hold will be built at Cleveland by the Jenks Ship Building Co. It is further stated that she is to go in the copper and ore trade between Lake Superior and Lake Erie ports." And he might still have further stated that the Jenks Ship Building Co. is located at Port Huron, Mich., not Cleveland, O.

GRAIN SHORTAGES.

The matter of shortages in grain cargoes, for which vessels have to pay, has become so serious that some vessel owners have tied up their boats rather than take the chances of having the profits of carrying a cargo at present rates all eaten up by a shortage for which they are not to blame, but for which they are held responsible. The steamer St. Paul is in ordinary at Detroit for that reason. The steamer Centurion arrived at Buffalo stort 696 bushel, and one of the Northern line steamers was short 511 bushels. The latter has refused to pay for the shortage, but may be forced to do so. The short Duluth cargoes are said to all come from one elevator.

SPEED OF THE U. S. S. MINNEAPOLIS.

The United States cruiser Minneapolis has done even better than the first reports indicated on her trial trip. Commodore Selfridge telegraphed the navy department that the vessel made 23.05 knots subject to tidal corrections. These corrections were made on Tuesday and the commodore reported that after making allowance for the tides and currents the average speed was 23.07 knots. By the contract she was required to make 21 knots and the builders were to receive a bonus for excess speed on the basis of $50,000 for each quarter knot, so that the premium earned will amount to $414,600. Including the earned premium the total cost of the vessel is $3,204,600.

DECIDEDLY PREMATURE.

A Chicago special on Wednesday says: Two steel schooners about 300 feet long and with a molded depth of 24½ feet, will be constructed by the Chicago Shipbuilding Co. for the Minnesota Steamship Co., to be ready by the opening of navigation in 1895. The contract has virtually been closed for the two boats. The Minnesota company now has eight steel steamers of the larger class, but has hitherto not looked with favor on towbarges. The construction of barges at this late day indicates that the company has changed its theories and sees the decided advantage in towing. All the details connected with the new boats have not yet been arranged, but it is certain that they will not be straight backs or of other mongrel type. They will be built to carry 3,000 tons on the present draft of water, but their great moulded depth shows that they are really constructed for the twenty-foot channel. These will be the first boats yet constructed of steel on the lakes to be equipped with sail power."

This is pronounced by the manager of the line at Cleveland as being decidedly premature. No plans or specifications have yet been decided on, much less contracts placed, hence the addition to the fleet is widely in the future.

THE CRUISE OF THE "REVERIE."

AN EFFICIENT STEAM YACHT.

Possibly through the beneficient solicitations of good Father Neptune, whom the writer has known and revered from early childhood, a graceful invitation was received to take a short ocean trip on the handsome screw steam yacht "Reverie" belonging to F. G. Bourne of New York. The cruise was from New York to New London to witness the Varsity boat races, thence through the Sound to Newport and home through the Atlantic ocean, leaving Long Island on the starboard hand. I shall not readily forget the entrancing panorama presented to view by the natural beauties of the Sound with its glorious waters bedecked by all manner of rowing, sailing and steam craft, there was the small sculling boat, the pair oar and the four oar gig or outrigger and then came the Varsity eights of Yale, Harvard and Columbia, Naptha and steam launches there were without number and with unlimited speeds—and least between six and twenty-six miles per hour—cutters and schooners, yawls and cat boats by the dozens. Sloops and powerful ocean steam yachts could be seen on every hand, side-wheelers and auxilliary screws, yachts with great sail power and elegant accommodation and with all things safe and necessary to make a voyage around the world pleasant and instructive; but amongst all these none were more graceful and as few could be more efficient, either with regard to motive power, the completeness of accommodation or in elegance of furnishings, than the "Reverie." However, it is now more than time to leave this preface almost bordering on romance for a practical and exact general description of this little steamer and her machinery.

As regards the profile: The stem is of the cut water type adorned by a classical figure-head and bowsprit, the counter is narrow and long but the load line aft is not too fine, consequently the after end shows but a slight tendency towards depression, even at the highest speed. The screw, which by the way is a famous "Trout wheel," is supported by a brass stern post and stern frame. The diameter of screw is 4′ 6″, pitch 7 feet and expanded area of four blades 8 square feet. The principal dimensions of the hull are, length 133 feet, breadth 16½ feet, depth 9½ feet, her water lines are very fine and the displacement 140 tons.

The main engines are of the triple expansion type, with air pump attached to the low pressure engine. The dimensions of cylinders are 11x16½x26x12 inches common stroke of piston; the valves, both piston and slide, are actuated by the Stevenson link, which has very large surface, as also have the crank pins and main bearings, the advantage of ample length in these parts was conclusively established by the ease with which these engines worked at sea when making 245 revolutions per minute without a drop of water being run on to any bearing. At 245 revolutions the yacht attained a mean speed of 15.3 knots per hour, and for nearly a day the average speed was 14.37 knots. To make a comparison with other steamers I will use the formulae:

$$\frac{D^{2/3} \times S^3 \text{ or } 140^{2/3} \times 153^3}{1 \text{ H.-P.} \qquad 308} = 314$$

This is high efficiency. The steam ranged between 190 and 203 pounds; this was the extreme range of pressure, but for the greater part of the voyage it did not vary one per cent. from 200 pounds.

This maintenance of a steady steam pressure with three or four auxilliary engines working at the same time as the main engines may be looked upon as satisfactory if the dimensions of the boiler are not comparatively large, the weight not excessive, the parts accessible and durable and the consumption of fuel fairly low.

Well, the extreme dimensions of this boiler are length 9 feet, breadth 7 feet, height 8 feet, weight 10¼ tons complete.

A very good arrangement of mechanically forced draught is attached to the boiler, but this was not required during the trial referred to, as the boiler supplied ample steam with the easiest possible firing with anthracite coal, and no effort was made to obtain maximum power or speed, though at another time forced draught equal to half an inch water pressure was freely applied to the furnace without the slightest injurious results.

As many eminent marine engineers appear to be convinced that the tubulous or water-tube boiler will probably supplant the Scotch and other form of shell boiler notably Mr. A. E. Seaton, who has fitted a Babcock and Wilcox boiler in Messrs. Thomas Wilson & Sons' ocean steamer "Nero," I may state with all deference to the impartial opinions of others, my views concerning tubulous boilers.

OBJECTS DESIRED OR AIMED AT BY THE ADOPTION OF WATER-TUBE BOILERS:

1. Safety against disastrous explosions with largely increased steam pressures.
2. Reduction of weight of boiler and of water necessary to produce steam.
3. Increased facility for fitting on shipboard or removing therefrom.

4. Larger furnaces adapted for the combustion of inferior fuel or wood.

5. Economy of fuel consumption and rapidity of raising steam.

CONDITIONS NECESSARY TO SUCCESS:

A. Wrought iron or mild steel only should be used in the construction of such boilers.

B. To secure lightness, comparatively small tubes should be used.

C. Tubes and connections should not be too thick, or the saving in weight over the Scotch boiler will not be great.

D. Tubes must be straight and not so small as to preclude cleaning with ordinary tools.

E. Two thicknesses of metal such as obtain with screw joints, must not be exposed to the impact of heat or flame.

F. As little brick work as possible should be fitted in the furnace or elsewhere.

G. The water circulation should not be so rapid or strong as to cause the water to leave the tubes exposed to the impact of heat or flame.

H. The boiler should be so designed and constructed as to withstand change of form resulting from great differences in temperature without leakage or distress.

I. The convecting and conducting powers should be such that steam may be raised say within a fraction of an hour (by means of forced draught or otherwise) without injury resulting from great variation in pressure.

J. The construction of the boiler should be so simple that considerable repairs—such as the replacing of pitted or split tubes—may be quickly effected by the boiler-room staff.

The Babcock & Wilcox boiler on the yacht "Reverie" may safely be worked up to 225 pounds pressure.

It supplies steam to an engine which in ordinary and easy working indicates 38 horse-power per ton weight of boiler.*

All the tubes are straight, of medium diameter and can be easily seen and cleaned. There are no joints or double thicknesses of tubes exposed to the flame and no brick work incorporated into their construction, except the usual bridge.

These boilers have an average evaporation of 11.4217 pounds of water per pound of combustible. This is within four per cent. of Ralkins standard, within seven and one-half per cent. of the highest theoretical efficiency under the conditions in which they were made, and it is not probable that any kind of boiler, fairly tested will beat such a record.

This boiler can be taken in or out of a hatchway not more than one foot wide by six feet in length.

It will equal any other safe, getatable durable boiler in evaporative efficiency—this I understand is guaranteed.

Cast iron is totally eliminated from these marine boilers, the headers being made of welded mild steel and the tubes strongly expanded into carefully turned holes, thus making the strongest and most durable form of tube connections, and which permits of repair as easily as any other form of joint.

On account of the inclination of the tubes there is no reserve about forcing the boiler with a blast in the ash-pit, the boiler having developed 506.6 horse-power (horse-power equals fifteen pounds of water evaporated into dry steam—triple expansion engine practice) for eight hours continuous steaming.

The material used throughout is open-hearth steel, hydraulic forged from the rolled plate, after having been heated in a reverberatory furnace. Only one operation is taken on any one plate at any one heat, and every forging is annealed after it has had the last operation taken on it. The tubes are the best lap-welded, charcoal iron tubes that it is possible to obtain.

The boiler consists of two banks of lap-welded wrought iron tubes, connected at their ends by being expanded into forged steel headers arranged to give the tubes an inclination of at least 15 degrees. The banks of tubes so constructed are connected at their bottom and lower end by a common water connection in the rear of the bridge wall, and above, at front and rear, to a common steam and water reservoir, the latter entirely shut off from the action of the heat.

The circulation of water through the boiler, on account of the inclination of the tubes, is positive, and always in one direction, namely, from the drum down the rear headers, up the inclined tubes to the front headers, returning to the drum through the upper return pipes.

Due to the inclination and the full sized connections between all parts, it is impossible for any steam pockets to form at any point, consequently the heating surface is always thoroughly covered with water.

The headers into which the main heating tubes are connected and corrugated for the purpose of disposing the tubes of the heating surface above each other in a staggered position and thus present their surface more directly to the action of the gases and mix the gases in their passage across the tubes. The side headers are not corrugated, but plain, so as to enable the tubes to placed in a vertical row above each other to form a portion of the side casing of the boilor. The side and central sections are so connected as to make the water circulation the same in both.

The headers are formed of a plaid sheet of open-hearth steel, one-half of an inch in thickness; the tube holes are bored one-sixteenth of au inch larger than the diameter of the tube, to facilitate the romoval of the tube if necessary. The same applies to the headers forming the side slabs enclosing the boiler, with the exception of the staggering.

The hand-hole fittings for closing the hand-hole openings opposite each end of each tube are all wrought metal, consisting of nut, hand-hole plate, bolt and inside guard. The inside guard is formed in such a manner as to close tha opening against any serions leakage, should the 1-⅛" bolt used for this purpose give out from any cause whatever, and prevent the emptying of the boiler except such loss of water as would be caused by a leaky joint of very small area.

All the joints between the various parts of the boiler are formed by expanding heavy, lap-welded, wrought-iron tubes into bored holes.

The elevated steam and water reservoir at the rear end of the boiler is reinforced by heavy straps, double riveted on the outside, into which the horizontal tubes at the top of the boiler, connecting the front end of the headers with the drum, are expanded; and also on the bottom side of the drum, into which the circulation tubes, extending down into the headers, are expanded. The heads of the drum and the manhole stiffening rings are flanged at the same heat.

The casing of the boiler is formed of wrought iron, with doors at front and rear for access to the ends of the tubes, through which all the headers can be reached, and the inside surface through the handholes. The exterior surface of the tubes can be cleaned from soot by a blow tube passed between the nipples connecting the upper and lower sets of sections in both front and rear of the boiler.

The side casings are formed of sheets of asbestos millboard, ¼" thick, laid up against the tubes forming the side setions. This is in turn covered by a casing formed in slabs, consisting of two inches of magnesia covering supported on both sides by light wrought iron plates. The whole of the casing can be removed in sections for exterior examination of the tubes if desired.

Above the boiler proper, enclosed in casing form in the same way, is placed a feed water heater formed in two independent parts, through which all the feed water to the boiler is supplied. Should this become disabled, it can be shut off and the boiler fed directly from the feed pump. This arrangement reduces the temperature of the escaping gases very materially, and it insures the boiler being fed with hot water.

The endeavor has been to perfect a marine type of boiler in which absolutely every pound of metal under pressure shall be either the best open-hearth steel or wrought iron, and in which every square inch of surface, inside and out, shall be accesible for cleaning and actual inspection. This it appears has been done, and there are no cast iron fittings or other devices used simply because they can be picked up in the market; but every part has been designed and especially made for the purpose for which it is intended. The manufacturers appear to have gone into the marine boiler business on a very conservative basis, having been experimenting at their own expence since 1876. They have built some thirty marine boilers in all, and it is only in the last few years that they have felt that they had surmounted the numerous difficulties which stand in the way of making a really successful high pressure marine boiler. The development of forged headers and other parts is the last step in the perfection of the design which they felt was absolutely necessary in order to insure success.

In conclusion let me add that it by no means follows that because a boiler supplies steam to an engine driving a boat thirty miles an hour, that such is a generally efficient steam generator and suitable for ordinary work on board of a steam boat. I cen take a piece of copper or iron pipe, twist it round into a cell and place fire under it and it will make steam sufficient for a thousand horse-power per ton weight of generator, but such a generator would be practically useless on board of a merchant steamer, for heating surface cannot with economy be gained at the expense of cleaning and repairing space or facilities, and lightness may be too dearly bought at the cost of proper circulation and durability.

*As a tube 6 inches in diameter would require to be double the thickness of one 3" diameter to withstand the same pressure, then the larger tube whilst having four times the capacity for water would only have twice the heating surface. Preferably the lower rows of tubes should be larger in diameter than the rows more remote from the fire grate.

RAFT REGULATIONS.

The following raft regulations for the lakes have been pessed in the House during the week:

For entering and navigating all harbors with narrow channels, all rivers navigated by vessels other than rafting tugs, except in the rivers St. Mary, St. Clair, Maumee, Detroit, and Niagara, said harbors or rivers being on or connecting with any of the Great Lakes, and for entering or passing through the Portage Lake Ship canals across Keweenaw Point, Michigan, logs shall be made into crib rafts, and be held together by frequent cross sticks, chains, or cables; and shall be handled by two tugs of sufficient power to properly control them. Each failure to comply with this restriction shall constitute an offense. The provisions and restrictions of this act with reference to the character, size, and construction of rafts, and methods of towing shall not apply to those portions of the waters of Lake Superior bordered by the States of Wisconsin and Minnesota.

On the St. Marys River between Sault Ste. Marie and the head of Mud Lake, at a point 2 miles below the position of the Encampment Crib light, rafts shall be securely fastened by cross-ties, or otherwise, to preserve, as far as possible, a uniform width; each raft shall be handled by not less than two tugs of sufficient power to keep the raft under control and to move it as far as possible to one side of the channel sufficiently to permit vessels to pass; and each failure to comply with this restriction shall constitute an offense.

On the St. Clair, Maumee, Detroit and Niagara rivers, rafts shall not exceed in length 2,200 feet, nor in width 200 feet; they shall be securely cross-tied to preserve uniform width; and each failure to comply with this restriction shall constitute an offense.

NOTES.

THE man who succeeds in business generally deserves success. The luck theory is carried too far. Some men acquire wealth and prominence through a chance in fortune's wheel, but by far the greatest proportion owe prosperity to systemmatic effort, personal energy and unremitting toil.—*Traffic* (*Philadelphia*).

THE Fall River line has issued a neat pamphlet showing in map form the route taken by their line of boats between New York and Fall River; also containing a table of distances and other information of value to the traveler. O. H. Taylor, Pier 28 North river, New York, will forward the souvenir to any address on receipt of a one-cent stamp.

J. F. HOLLOWAY, formerly of the Cuyahoga Works Cleveland, O., and now with the Worthington Pump Co., of New York, has a very entertaining reminiscence of early Steamboats on the Great Lakes" in the July number of the *Engineering Magazine*. The article is of special interest to engineers and as well contains incidents which laymen will not be slow to appreciate.

ONE of the largest engine contracts recently let is that secured last week by the Edward P. Allis Co., of Milwaukee, for four engines for the Metropolitan Elevated Railway Co. of Chicago. Two of them will be vertical, cross-compound, condensing engines, with a maximum capacity of 3100 horse-power each; and the other two will be of the same type, with a maximum capacity of 1500 horse-power each. The contract for the boilers has been awarded to the Babcock and Wilcox Co., and it calls for 32 of its 300 horse-power boilers.

MESSRS. RANDOLPH & CLOWES, Waterbury, Conn., whose Chicago branch house is located at No. 71 West Washington street, are, in addition to their regular seamless brass and copper tubing, paying special attention to pushing the sale of the Brown & Bros. patented seamless drawn copper house boilers, of which they are the sole manufacturers. These boilers are made especially strong, and all of them are tested, according to weight, up to 200 and 300 pounds pressure per square inch.

ELECTRICITY is largely used in the ship yard of Wm. Cramp & Sons, Philadelphia, for lighting and power purposes. In the boiler shop there are two 50 ton and one 10 ton electric cranes. A large horizontal drilling machine, having a horizontal motion of 14 feet, and a vertical motion of 8 feet, is also driven by electricity. Portable electric drills are also largely used in the shipyard. Messrs. Cramp have also followed the lead of William Denny & Bros., in adopting an electric planer for planing the decks of ships. The machine was imported from England.

THE *American Elevator and Grain Trade*, Chicago, very pertinently asks: What will become of the grain elevators on the Chicago river when the drainage canal has been completed? The elevators along the south branch will especially suffer, as the tunnels under it will prevent a deepening of the river channel, and it is estimated that the water will be two feet lower than it is at present, which would permit vessels to draw only 14 feet when passing over the tunnels. The current will be four miles an hour, which will also make it a dangerous stream for the large lake vessels to navigate. This fact, together with the 20-foot channel at South Chicago, is attracting the new houses to that port.

CAPT. S. D. BABCOCK, formerly of the Providence and Stonington Steamship Co., left to this community four sons, who for natural gentlemanly instincts, energy and push have no superiors. W. I. Babcock, the eldest, is at present general manager of the Chicago Shipbuilding Co. J. N. Babcock, a younger brother, is assistant passenger agent of tha Providence and Stonington Steamship Co. W. D. Babcock, another, is passenger agent of the New England Railroad, and David Babcock, the only one following commercial pursuits not connected in any way with shipping. Capt. S. D. Babcock was one of our ablest clipper ship masters in the fifties.—*Marine Journal, New York.*

THE U. S. Hydrographic Office are about to make some interesting experiments to ascertain the direction and speed of ocean currents by the use of bottles. For two years the Navy Department has been conducting experiments with bottles, but with little success, in view of the fact that few of them are seen, or are not recovered. These bottles contain a printed request, asking captains to note in their log the location of their ship when the bottle is found, and to estimate, if possible, the course taken by it since it was tossed into the sea. The office will now substitute larger bottles, shaped like a water decanter, the base to be wide and bulky and the neck long and slender. On the out side are to be stamped in large bold letters "H. O." and the number. The long neck of the bottle will cause it to stand vertically, and the color and its size, it is believed, will attract attention and cause ships to slow down and read the number. By entering this in the log, with the latitude and longitude, the direction taken and the distance covered can be ascertained every time the bottle is reported. The first trial will be made this summer, when a number of the bottles will be taken to sea by merchant ships and cast adrift.

WILLIAM L. BROWN, President.
WALTER F. COBB, Vice President and Treasurer.
W. I. BABCOCK, Manager.
O. R. SINCLAIR, Secretary and Asst. Treas

Chicago Ship Building Company,

STEEL STEAM-SHIP BUILDERS.

101st Street and Calumet River.

LONG DISTANCE TELEPHONES:
SHIP YARD OFFICE, "SOUTH CHICAGO 40."
CHICAGO OFFICE, 1013 ROOKERY, "MAIN 3447."

SOUTH CHICAGO, ILL.

Mannheim Insurance Company,

OF MANNHEIM, GERMANY.

CAPITAL, $2,000,000 ASSETS, $3,078,538.22
Deposited in the U. S., $350,000

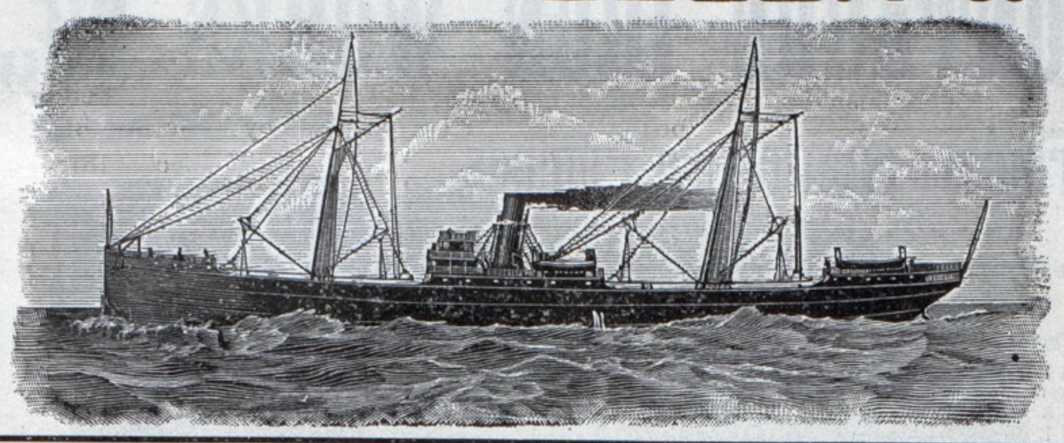
UNITED STATES MANAGER:
Jas. Johnstone Riley, - - New York.

Insures Hulls, Freights and Cargoes.

Marine and Inland Department.

HENDERSON BROTHERS,
General Western Agents,
176 Jackson Street, Chicago, Ill.

F. W. WHEELER & COMPANY.,



BUILDERS OF ALL KINDS OF
IRON, STEEL AND WOODEN SHIPS,
FOR LAKE OR OCEAN SERVICE.
West Bay City, Mich.

F. W. WHEELER, Prest. E. T. CARRINGTON, Vice-Prest.
F. L. GILBERT, Secretary.

INCORPORATED 1794.

Insurance Company of North America.

CAPITAL, Paid up in Cash, - - $3,000,000.00
ASSETS, - - - - - - 9,432,249.80

CHARLES PLATT, President. WILLIAM A. PLATT, Vice-President.
EUGENE L. ELLISON, 2nd Vice-President. GREVILLE E FRYER, Sec'y & Treas.
JOHN H. ATWOOD, Assistant Secretary.

Lake Marine Department.

GEORGE L. McCURDY, Manager,
CHICAGO, ILLS.

MARINE AND INLAND INSURANCE.

ATLANTIC MUTUAL INSURANCE COMPANY,

(ORGANIZED 1842.) Office, 51 Wall Street, NEW YORK.

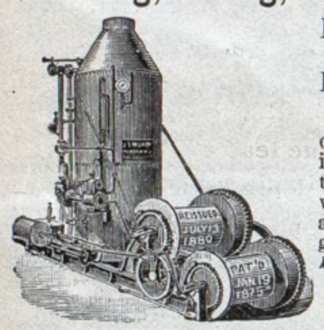
Insures against Marine and Inland Transportation Risks and issue Policies making Loss Payable in England.

Assets over $10,000,000 for the Security of its Policies.

The profits of the Company revert to the assured, and are divided annually upon the premiums terminated during the year; thereby reducing the cost of insurance. For such dividends, certificates are issued bearing interest until ordered to be redeemed, in accordance with the charter.

J. D. JONES, Prest. W. H. H. MOORE, Vice-Prest. A. A. RAVEN, 2nd Vice-Prest. J. H. CHAPMAN, Secy.

Hoisting, Mining, Bridge Erecting,



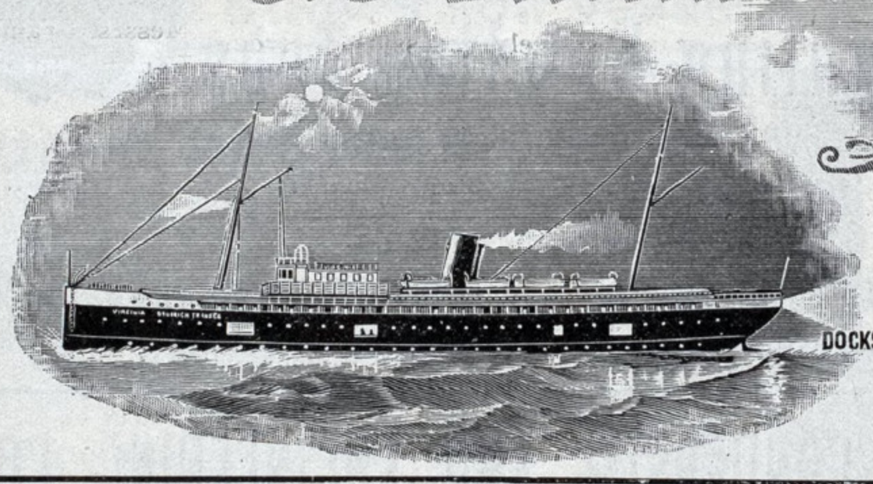
Dock Build'g, Pile Driving, Coal Hoisting and Quarry Engines

of any power, with my improved Patent Friction Drums, with or without Boilers. Any amount of reference given. Established 1870. Send for Catalogue.

J. S. MUNDY,
Newark, N. J.

1741 Market St., Philadelphia, Pa.
22 Light St., Baltimore, Md.
117 Water St., Pittsburgh, Pa.
249 South Jefferson St., Chicago, Ill.
715 North Second St., St. Louis, Mo.
39 Magazine St., New Orleans, La.
34 Fremont St., San Francisco, Cal.
85 Front St., Portland, Oregon.
Fourth & Wakouta Sts., St. Paul, Minn.
218 Congress St, Boston, Mass.

C. S. Richardson Fueling Co.



COAL

DOCKS { FOOT OF NORTH MARKET ST. / 18TH STREET BRIDGE. / ILLINOIS CENTRAL SLIP "C."

Office, 54 LaSalle Street,

CHICAGO.

BUCYRUS Steam Shovel AND Dredge Company,

South Milwaukee, Wis.

STEAM SHOVELS AND DREDGES

For all Purposes.

CAPITAL $300,000.

The Marine Bank Company,

Incorporated in 1891 under State Law. CLEVELAND, OHIO.

Successors to E. B. HALE & CO., established in 1852.

DIRECTORS:

W. H. BARRISS, President. H. C. RANNEY, Vice-President. W. B. HALE, Cashier.
C. E. BURKE. THOS. FITZPATRICK. THOS. H. WHITE. MARTYN BONNELL

Would be pleased to meet or correspond with any one whose present Banking relations are not entirely satisfactory, or who, for any reason, propose to open a new account.

We promise to make every effort to make our Bank a safe, agreeable and profitable place to do business.

MARINE VALVE OIL

FOR CYLINDER LUBRICATION OF THE LARGE STEAMERS ON THE GREAT CHAIN OF LAKES IS UNSURPASSED.

Marine Valve, Renown Engine, Eldorado Engine, Crank Case, Victor Signal, Dark Lubricating, Mineral Seal, Head Light, Arctic Cup Greases, and Lard Oils.

CARRIED IN STOCK AT THE

Standard Oil Company's Marine Depot,

123 RIVER STREET, CLEVELAND, O.

Telephone 77. Main Office Telephone 682.

ALSO FOR SALE BY

STANDARD OIL COMPANY,

No. 5 Wabash Ave., Chicago, Ill.
Racine, Wis.
Broadway and Mason, Milwaukee, Wis.
Sheboygan, Wis.
Manitowoc, Wis.
Green Bay, Wis.
Marinette, Wis.
Oshkosh, Wis.
Duluth, Minn.
West Superior, Wis.
Hancock, Mich.
Marquette, Mich.
Sault Ste Marie, Mich.
Michigan Central Railway and 10th St., West Bay City, Mich.
Eighth and Sears Sts., Saginaw, Mich.
46 Jefferson, Detroit, Mich.
Summit and Monroe Sts., Toledo, O.

ATLANTIC REFINING COMPANY, French and 16th Sts., Erie, Pa.
D. ROBESON, Port Huron, Mich.
W. S. McKINNON, Ashtabula Harbor, O.
HULL & RAND Huron, O.
STANDARD OIL COMPANY, Star Oil Works, Buffalo, N. Y.
BABY & DALE, St. Clair, Mich.
N. C. ALTEN, Lorain, O.
A. F. HARRINGTON, Conneaut Harbor, O.
C. H. McCUTCHEON, Buffalo, No. 18 Ohio St.
A. H. McGONAGIL, South Chicago, Ill.
MARINE SUPPLY CO, Fairport, O.
F. KRANZ, Sandusky, O.
THE M. I. WILCOX CORDAGE & SUPPLY CO., Toledo, O.

CRANDALL'S PATENT PACKINGS.

FOR STEAM, WATER AND AMMONIA.

Not having been subjected to the injurious chemical action of boiling oil, outlast all others, and never melt and gum. We are constantly displacing other packings on Lake and Ocean Steamers, and can guarantee our goods for marine work. Ask the man offering "the same thing" to explain his process. He boils his goods in oil.

Send for Descriptive Catalogue and Samples.

CRANDALL PACKING CO.

New York, 136 Liberty Street. Chicago, 51 S. Canal Street. Main Offices and Works, PALMYRA, N. Y.

MARINE REPAIRS.

Electric power and lights for night work.
Largest steam forge on the northern waters.
Prompt and thorough attention to all work.
Charges low and satisfaction guaranteed.

The Soo City Machine and Boiler Works,

Works on Union Dock. Sault Ste. Marie, Mich.

AMERICAN LINE.

For Queenstown and Liverpool.

The only Trans-Atlantic Line sailing under the American Flag. Sailing every Wednesday from Philadelphia and Liverpool, and extra sailing on alternate Saturdays.

LORD GOUGH, August 16, 12:30 p. m.
OHIO, August 23, 6:30 a. m.

For rates of passage and other information, apply to

The International Navigation Company,

Nos. 305 and 307 Walnut St.,

PHILADELPHIA.

PATENTS

Promptly secured. Trade-Marks, Copyrights and Labels registered. Twenty-five years experience. We report whether patent can be secured or not, free of charge. Our fee not due until patent is allowed. **32 page Book Free.**
H. B. WILLSON & CO., Attorneys at Law, Opp. U. S. Pat. Office. **WASHINGTON, D. C.**

PACIFIC MAIL
STEAMSHIP COMPANY

REGULAR MAIL LINE

NEW YORK TO SAN FRANCISCO
(Via Isthmus of Panama).

SOUTH PACIFIC, CENTRAL AMERICAN AND MEXICAN PORTS.

San Francisco to Japan and China, connecting for ports of British India.

First class accommodations for Freight and Passengers.

For freight, passage or general information, apply to any of the following:

H. J. BULLAY, Gen. Supt., New York.
E. A. ADAMS & CO., Gen. Eastern Agts, Boston.
A. CENTER, Gen. Agt., San Francisco, Cal.
JOHN M. DOW, Gen. Agt., Panama.
C. D. HARMAN, Agt, Yokohama, Japan.
J. S. VAN BUREN, Agt., Hong-Kong, China.

PROPOSALS.

U. S. ENGINEER OFFICE, Oswego, N. Y., July 7, 1894. Notice is given to all persons interested in wreck of schooner Christina, in Harbor of Sackett's Harbor, N. Y., that if within thirty days from date of this advertisement they shall not have notified this office of their intention and taken preliminary steps to remove said wreck as soon as practicable the wreck will be regarded as abandoned and derelict and will be removed by the United States in accordance with law. Sealed proposals, in triplicate, will be received here until 12 M. Saturday, August 7, 1894, for removal of abovenamed wreck. All information furnished on application. DAN C. KINGMAN, Capt. of Engineers. 27-30

$2.00 Pays for 52 copies of THE MARINE RECORD, including all Supplements.

ESTABLISHED 1871. INCORPORATED 1893.

MONTAGUE IRON WORKS CO.,

MANUFACTURERS OF

Marine and Stationary Engines

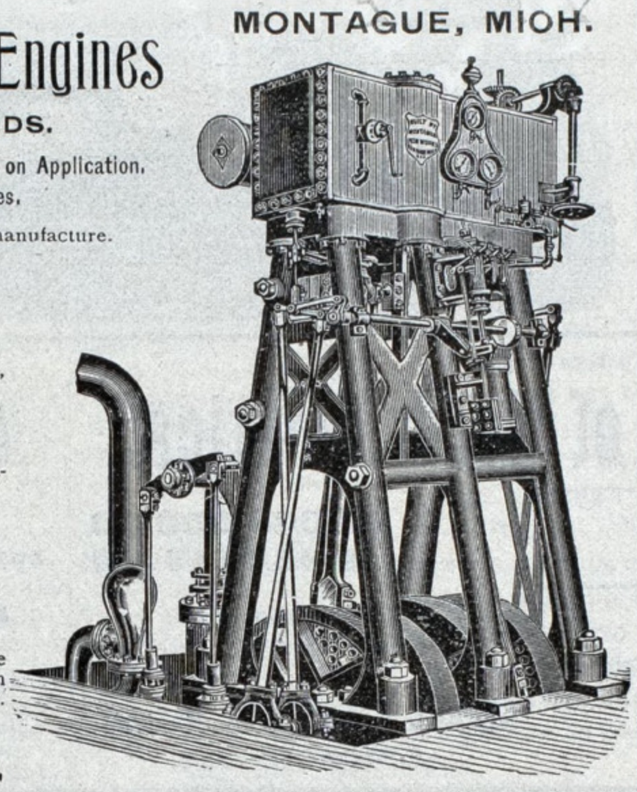
AND BOILERS OF ALL KINDS.

MONTAGUE, MICH.

Heavy Castings a Specialty. Prices Quoted on Application.
Fore and Aft Compound Marine Engines.

The Engines in the ollowing boats are of our manufacture.

Edward Buckley, Manistee, 18 and 36x30.
Sachem, Grand Haven, 21 and 38x36.
Charles A. Street, Chicago, 20 and 36x36.
Isabella J. Boyce, Michigan City, 19 and 32x26.
M. T. Greene, Chicago, 20 and 36x36.
Passenger and Freight Steamer, Mabel Bradshaw, Muskegon, 16 and 28x26.
Ionia, Grand Haven, 24 and 46x42.
Survey Steamer, W. S. Hancock, 12 and 21x20.
Mark B. Covell, Manistee, 18 and 30x26.
Passenger and Frieght Steamer, Bon Voyage, Saugatuck, 16 and 30x26.
Tug, Hunter, Chicago, 15 and 28x22.
Tug, Edward G. Crosby, Muskegon, 16 and 30x24.
Oval Agitator, Chicago, 14 and 28x20.
Tug, Peter Coates, Sault Ste Marie, 10 and 20x16.
Luella H. Worthington, Cedar River, 19 and 36x30.
Passenger Steamer, E. G. Maxwell, Pentwate 14 and 28x20.



The engraving represents our 20 and 36x36 Fore and Aft Compound Marine Engine. We build them all sizes and guarantee them to give satisfaction.

Prices furnished on application.

Montague Iron Works Co., Montague, Mich.

G. L. STUEBNER & CO.

MANUFACTURERS OF

SELF-DUMPING AND

Self-Righting Hoisting Tubs

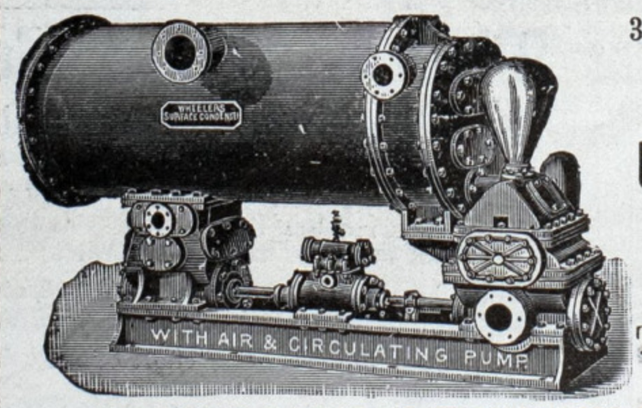
FOR COAL, ORES, CLAY, SAND, Etc.

Side, End and Bottom Dumping Cars, Coal and Coke Barrows, Iron Dock and Hook Blocks, Etc.

168-176 East Third Street, - - LONG ISLAND CITY, N. Y.

ILLUSTRATED CATALOGUE SENT ON APPLICATION.

WHEELER CONDENSER AND ENGINEERING CO.



39 & 41 Cortlandt St., NEW YORK

Proprietors and Manufacturers of

WHEELER'S IMPROVED

Patent SURFACE CONDENSERS

ALSO THE

Wheeler "Admiralty" Condenser,

WITH PATENT SCREW GLANDS.

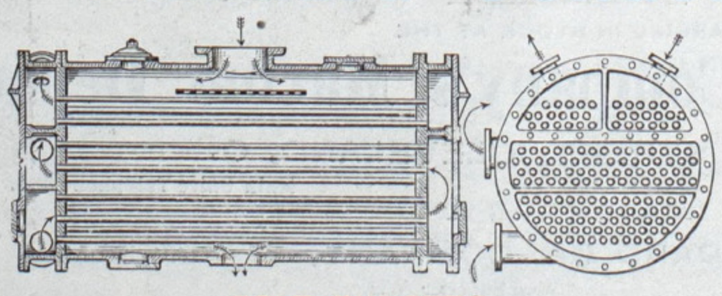
The Wheeler-Lighthall Condenser

With Patent Waterproof Packing.

LIGHT WEIGHT SURFACE AND JET CONDENSERS, FOR STEAM YACHTS, ETC., A SPECIALTY

F. P. BUDDEN, President. W. E. VOLZ, Treas. and Gen'l Mgr.

Standard Condenser Co.,



SOLE BUILDERS

Patent Combined Surface Condenser and Feed Water Heater.

BUILDERS OF

LIGHTHALL

Surface Condensers,

Tube Heads, Patent Brass Screw Glands, Packings, Etc.

CONDENSER REPAIRS.

15 State St., New York.

SEND FOR CIRCULAR.

$2.00 or $1.00 Pays for one year or six months respectively and THE MARINE RECORD gives you all the news of the lakes. Address SMITH & SWAINSON, Leader Building, Cleveland, O.

CENTRIFUGAL
PUMPS for COAL,

SAND OR DREDGING.

Wrecking Pumps a Specialty.

SUPERIOR TO ANY OTHER

16,000 IN USE.

Our Water Ballast Pump will throw more water with less steam than any other. Photographs and estimates on application.

MORRIS MACHINE WORKS,

Baldwinsville, N. Y.

HENION & HUBBELL, Agents,
55 and 57 N. Clinton St., Chicago, Ill.

North Atlantic
Trident Line.

DIRECT SERVICE

Between Philadelphia and London.

The following strictly first-class steamers are appointed to sail from Philadelphia to London direct.

"HOLKAR".....5,000 tons, August 31, 1893.

For rates, etc., apply to

CHAS. M. TAYLOR'S SONS,

15, 16 and 17 Merchants' Exchange,

PHILIP W. RICHARDSON,

3 Fen Court, London, E. C.

Improved Bolt Helmet.

ESTABLISHED, 1844.

A. SCHRADER & SON,

Manufacturers of

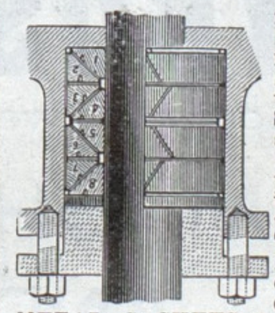
Submarine Armor

AND

Diving Apparatus.

32 ROSE ST., N. Y

Katzenstein Self-Acting Metal Packing



for Piston Rods, Valve Stems, Etc., of every description, for Steam Engines, Pumps, Etc. Adopted and in use by the principal Iron Works, Steamship Companies, Mills and Engine Builders, Electric Light and Power Plants within the last twelve years in this and foreign Countries. Also FLEXIBLE TUBULAR METALLIC PACKING for Slip-Joints on Steam Pipes and for Hydraulic Pressure. Also METAL GASKETS for all sizes and shapes of flanges. Double-Acting Balanced Water-tight Bulkhead Doors for Steamers. Also Agents for the McColl-Cumming Patent Liquid Rudder Brake.

L. KATZENSTEIN & CO., General Machinists, Brass Finishers and Engineers' Supplies, 357 West Street, New York, N.Y.

E. G. ASHLEY,

CHOICE FAMILY GROCERIES.

ALSO ALL KINDS OF

Fresh, Salt and Smoked Meats.

Vessel orders attended to day and night. Goods delivered by Steam Yacht "Maggie D."

36 & 38 Summit Street, TOLEDO, O

Scott's New Coast Pilot,

FOR THE LAKES.

New Edition for 1894.

For sale by Ship Chandlers and Booksellers, and by the Publishers, at 115 Baldwin Ave., Detroit, Mich.

IRA B. BASSETT. GEORGE PRESLEY, JR. A. R. TRAIN.

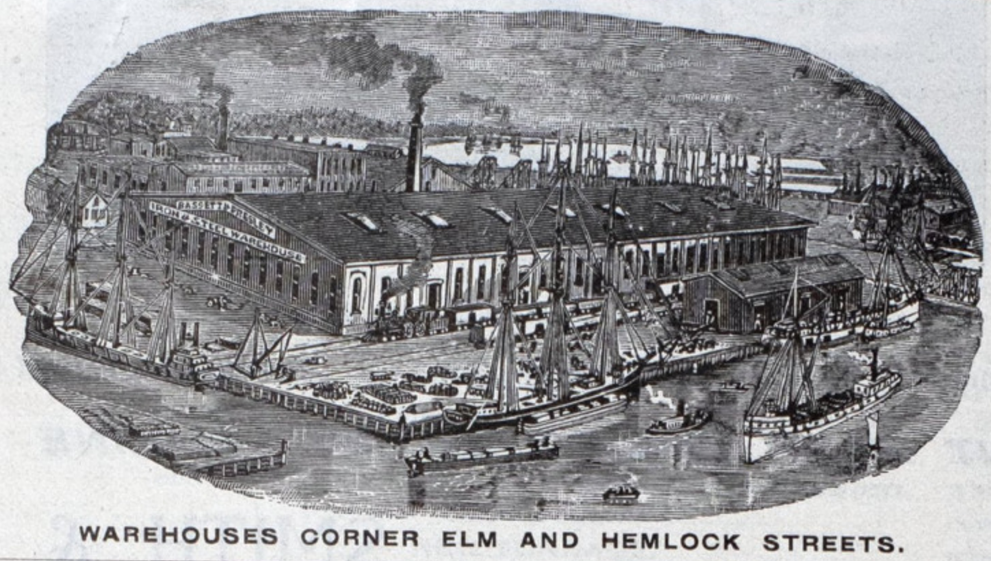
BASSETT, PRESLEY & TRAIN,

Iron and Steel Warehouses.

SHIP PLATES, SHIP SPIKES, ANGLES, BEAMS, CHANNEL AND TEE IRON, BOILER TUBES, BOILER, TANK AND COOPER RIVETS, STEEL BOILER PLATES, BAR, BRIDGE AND CAR IRON, HOOPS, BANDS AND SHEET IRON.

CLEVELAND, · · · · · · OHIO.

WAREHOUSES
17 TO 31 MERWIN ST.
AND COR. ELM AND
HEMLOCK STS.



WAREHOUSES CORNER ELM AND HEMLOCK STREETS.

GENERAL
OFFICES
17 MERWIN
STREET.

BURDEN IRON COMPANY BOILER RIVETS.

THE STANDARD AND ONLY RIVET USED BY ALL FIRST-CLASS BOILER MAKERS IN THE U. S.

Our Correspondents will please note that the Western Union Telegraph Co.'s Wires are connected with our Office, and much time will be saved in the transmission and delivery of Messages to us if sent via that Company.

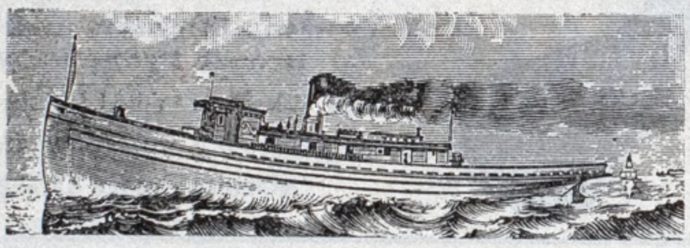
ACME SHAFTING. We own and control the sale of this celebrated brand and carry a full stock of all sizes and lengths. AGENTS FOR THE DIAMOND STATE HORSE SHOES.
Boiler, Bridge and Tank Plates, Nails, Boat and Railroad Spikes, Smoke Stack Rivets, Boiler Patch Bolts, Open Hearth Steel.

ARCHES AND STRAPS FOR VESSELS A SPECIALTY.

H. A. HAWGOOD, Pres't. GEO. ELSEY, JR., Gen'l Mang'r. J. A. SMITH, Sec'y.
PHILIP MINCH, Vice-Pres't. J. R. SPRANKLE, Treas.

The Cleveland Tug Company,

First-class Tugs, Steam Pumps, Divers, Hawsers, Lifting Screws, Etc., furnished Promptly on Orders by Telegraph or otherwise.



Steamers when outsidewanting our Tugs, blow one long whistle and as many short ones as they want tugs.

OFFICE, OPEN DAY AND NIGHT, EAST END MAIN ST. BRIDGE.
LONG DISTANCE TELEPHONE 919. CLEVELAND, OHIO.

MULLEN-GATFIELD COAL CO.,

Dealers in the Celebrated

MANSFIELD AND YOUGHIOGHENY COALS.

Docks at SANDWICH, ONTARIO, opposite the Fort at Detroit, with chutes for rapid fueling. Elevated docks and derrick at AMHERSTBURG, ONTARIO.

THE CUDDY-MULLEN COAL COMPANY

DEALERS IN COAL. Docks at Government Pier, Whiskey Island, and Adjoining Globe Dry Dock.

All fully equipped with Revolving Derricks; also, Lighter Carrying Derrick, and One Hundred Two and One-Half Ton Buckets.
Main Office, 81 Perkins Building, East Side of Main Street Bridge.
Dock Office, 127 West River St., Cleveland, Ohio. Telephone No. 8.
Boats Coaled Day and Night. Docks at Amherstburg and Sandwich, Ontario

---

I. H. OWEN, Prest., Chicago. F. H. VAN CLEVE, Sec'y, Escanaba. Capt. GEO. BARTLEY, Supt., Escanaba.

ESCANABA TOWING & WRECKING COMPANY, Escanaba, Mich.

Tugs, Lighters, Steam Pumps, Hawsers, Hydraulic Jacks & Diving Appliances always ready.

TUG MONARCH.—Engine Compound, Cylinder 16 & 30 in. diameter, 30 in. Stroke, Steam Pressure allowed, 125 lbs.
TUG DELTA.—Cylinder 20 by 22, Steam Pressure allowed, 105 lbs.
TUG OWEN.—Cylinder 20 by 20, Steam Pressure allowed. 104 lbs.

CENTRIFUGAL PUMPS. SEVEN AND FOURTEEN INCH SUCTION

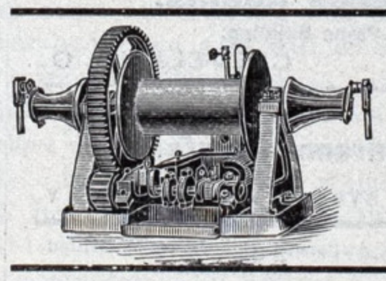
THE THOMPSON TUG AND WRECKING CO.,

OF PORT HURON.

Have the tugs Merick and Brockway, with lighter Clinton, fitted with McMyler's Improved Revolving Derrick for quick hoisting, stationed at Sault Ste Marie, Mich., ready to do all kinds of wrecking and raft towing.
Address CAPT. ROBERT P. THOMPSON, Sault Ste Marie, Mich.

Tug Chas. D. Thompson, tug building, engine 17 x 36 x 30, are stationed at Port Huron, and are fitted out with a complete wrecking outfit, ready to do all kinds of wrecking and raft towing. Address LYNN & THOMPSON,
Port Huron, Mich.

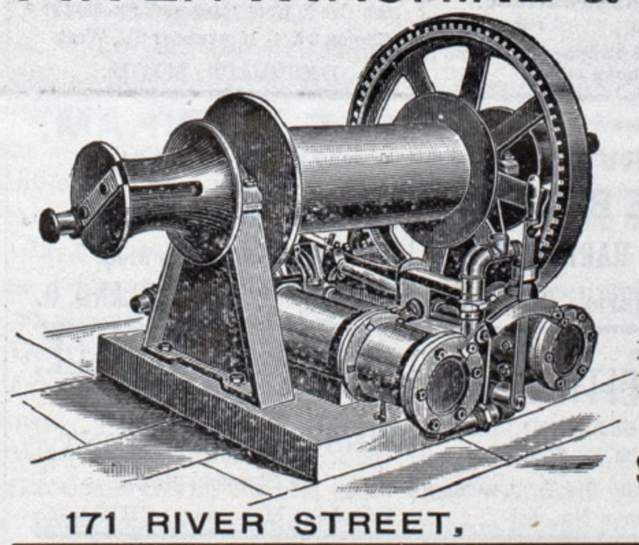
FOR STEAM PUMPS AND SMALL ENGINES
USE POWELL'S SINGLE CONNECTION LUBRICATOR
BY TRANSPOSING NIPPLE AND PLUG CAN BE MADE EITHER SIDE OR BOTTOM ATTACHMENT.
TESTED AND WARRANTED PERFECT.
THE WM. POWELL CO. CINCINNATI, O.



JACKSON & CHURCH,
BUILDER OF DUPLEX HOISTING AND DECK ENGINES.
Plain Finished and Automatic ENGINES, From Heavy Patterns at Moderate Prices.
Vertical, Horizontal, Marine and Locomotive BOILERS Strictly First-Class and Highest Test.
SEND FOR CIRCULAR AND PRICES. SAGINAW, MICH.

T. R. TEARE. M. THOMAS.

RIVER MACHINE & BOILER WORKS



MARINE AND STATIONARY
ENGINES, BOILERS,
. . AND . .
DECK HOISTING
ENGINES.

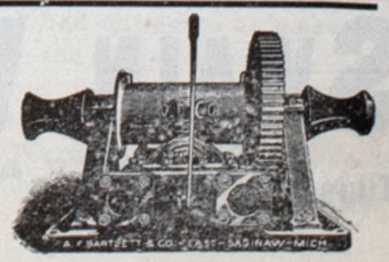
Starting, Stopping, Reversing and Lowering all done by working one Lever.

SOLE AGENTS FOR
St. John's Self Adjusting Cylinder Packing.

171 RIVER STREET, CLEVELAND, O.

BARTLETT DECK HOIST.

In use on the following vessels: Steamers—Roumania, Bulgaria, Germanic, Brittanic, George G. Hadley, S. S. Wilhelm, Majestic, Alex. Nimick, John Harper, Walter Vail, Panther, City of Berlin, City of Paris, City of Glasgow, City of London. Schooners—Tokio, Asiatic, Baltic, Celtic, Aberdeen, William D. Becker. Stopping, Starting, Reversing and Lowering, all done by working one lever.



A. F. BARTLETT & CO., · East Saginaw, Mich.

REPRESENTATIVE LAKE BUILT TONNAGE.

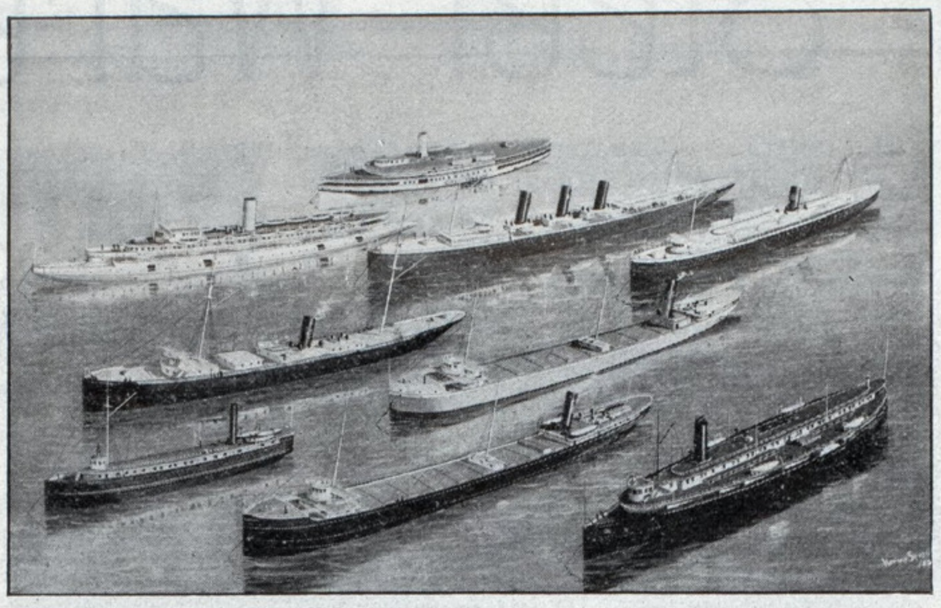
Nine Shipyards Represented. ILLUSTRATED. Elegant Photo-Gravure 16x22 Inches.

"CHRISTOPHER COLUMBUS,"
American Steel Barge Co.

"MANITOU,"
Chicago Shipbuilding Co.

"CITY OF TOLEDO,"
Craig Shipbuilding Co.

"MERCHANT."
David Bell Engine Works.



EXACT SIZE OF ORIGINAL 16X22 INCHES.

"NORTH WEST,"
Globe Iron Works Co.

"CITY OF ALPENA,"
Detroit Dry Dock Co.

"CENTURION,"
F. W. Wheeler & Co.

"ALVA,"
Cleveland Shipbuilding Co.

"CHEMUNG,"
Union Dry Dock Co.

Issued with Volume 17, No. 4, of The Marine Record. (Seventeenth Year of Publication.)

THE FINEST SUPPLEMENT EVER ISSUED BY ANY MARINE PAPER IN THE WORLD.

MAILED TO ANY ADDRESS
UPON RECEIPT OF 35 CTS.

SMITH & SWAINSON,
LEADER BUILDING. CLEVELAND, O.

MARINE AND INLAND INSURANCE.
SUN INSURANCE COMPANY
SAN FRANCISCO, CAL.
INLAND MARINE DEPARTMENT, CHICAGO, ILLS.
R. E. RISPIN, MANAGER, 6 AND 8 SHERMAN ST.

C. A. MACDONALD & CO.,
GENERAL MARINE INSURANCE AGENTS.
RIALTO BUILDING, CHICAGO, ILL.

THOS. WILSON,
MANAGING OWNER WILSON'S TRANSIT LINE,
General Forwarder, Freight and Vessel Agent. CLEVELAND, O.

C. R. JONES & CO., VESSEL AGENTS
FIRE AND MARINE INSURANCE.
Nos. 501, 502 and 503 Perry-Payne Bldg., CLEVELAND, O.

JOHN MITCHELL. JOHN F. WEDOW. ALFRED MITCHELL.
MITCHELL & CO., Vessel and Insurance Agents,
Office Telephone, 767. Residence John Mitchell, 3506.
508-509-510 Perry-Payne Building, CLEVELAND, O.

M. J. GALVIN. CAPT. ALEX. CLARK. J. A. BOLAND.
GALVIN, CLARK & BOLAND, Vessel and Insurance Agents.
TELEPHONE 892. NO. 60 MAIN STREET, BUFFALO, N. Y.

ESTABLISHED 1857.
THOMAS MARKS & CO.,
Merchants, Forwarders and Ship Owners.
PORT ARTHUR, CANADA.
N. B.—Special attention given to chartering vessels.

C. W. Elphicke. A. L. Fitch. Jas. A. Myers.
C. W. ELPHICKE & CO.,
Vessel Owners and Agents,
MARINE UNDERWRITERS.
6 & 8 Sherman St., CHICAGO,
Rooms 10, 11 & 12 Wheeler Block.
Telephone 1194.

A. A. Parker. James W. Millen. B. W. Parker.
PARKER & MILLEN,
Vessel & Insurance Agents.
Iron Ore & Coal Cargoes a Specialty.
Rooms 3 & 4 15 Atwater St., West.
DETROIT, MICH.

Calvin Carr. G. C. Blair. John Mitchell.
CARR & BLAIR
VESSEL AND INSURANCE AGENTS,
Rooms 1 and 2. Tel. Main 869
12 Sherman St. CHICAGO.

Marine Reporters. Vessel Agents.
HARVEY'S
MARINE BUREAU.
THOS. R. HARVEY, Mgr.
Sault Ste. Marie, - Mich.

C. E. BENHAM,
VESSEL AND
Insurance Agent,
613 Perry-Payne Bldg.
Telephone 170. CLEVELAND, O.

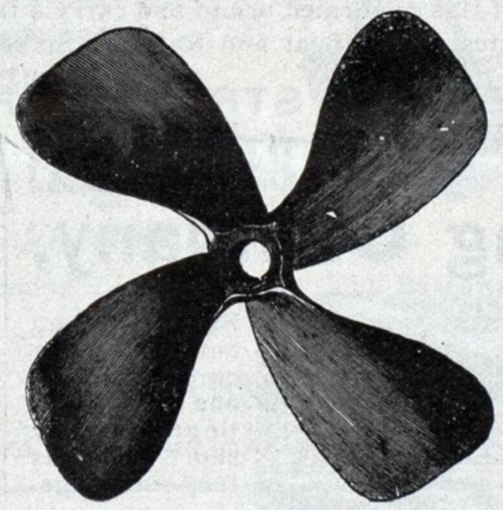
C. T. Palmer. H. W. Cook. Capt. J. A Calbick.
Palmer, Cook & Calbick,
Vessel Agents and Underwriters,
8 and 109 Royal Insurance Bldg. Chicago, Ill.
Telephone, Harrison 698.

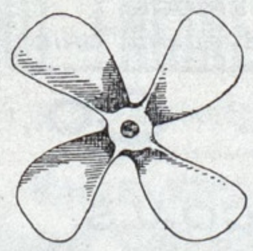
J. G. Keith. D. Sullivan.
J. G. KEITH & CO.
VESSEL AND INSURANCE AGENTS,
140 and 141 Rialto Bldg. CHICAGO.
Telephone No. 3658.

JOHN PRINDIVILLE,
VESSEL AND INSURANCE AGENT,
12 Sherman Street,
Telephone Main 129. CHICAGO.

SWAIN WRECKING CO.,
Tugs { FAVORITE AND SAGINAW.
Telegraph { PARKER & MILLEN, Detroit, Mich. Capt. M. SWAIN, Cheboygan, Mich.

H. G. TROUT,
KING IRON WORKS,
BUFFALO, N. Y.
MANUFACTURER OF
TRIPLE EXPANSION, THREE CYLINDER, FORE AND AFT AND STEEPLE COMPOUND
MARINE ENGINES,
High and Low Pressure Engines.
SECTIONAL TUG & YACHT PROPELLER WHEELS
Cowles Aluminum and Manganese Bronze Propeller Wheels.
These Wheels are noted for their extra speed and towing power, or a proportionate saving of coal.
PRICES QUOTED ON APPLICATION

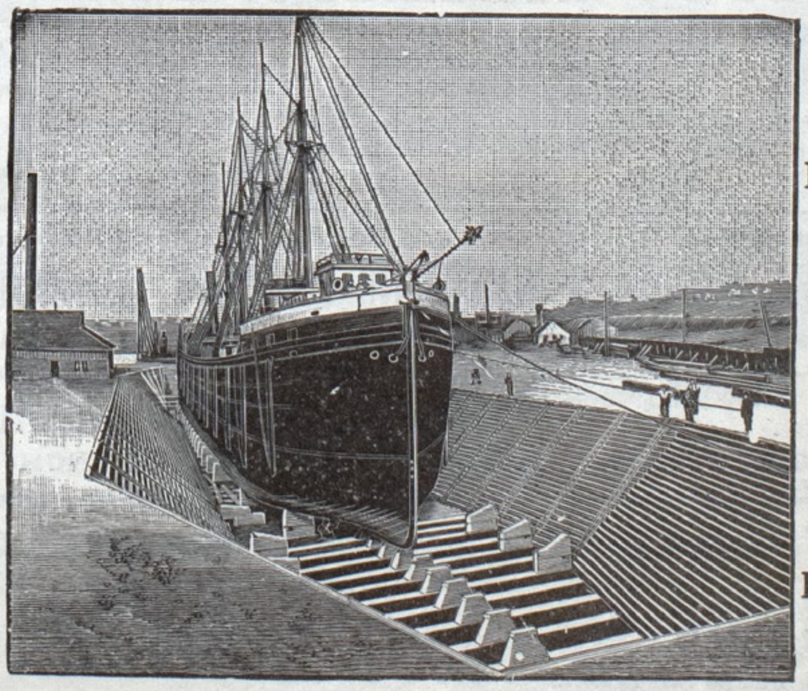




McKINNON MANUFACTURING CO.,
BOILER MAKERS, FOUNDERS AND MACHINISTS,
Marine Boilers, Engines and Ship-yard Machinery. Most Powerful set of Hydraulic Slings on the Lakes. Best Towing and Speed Propeller Wheels made. Send us a trial order.
Works and Office, 224-230 N. Water St., BAY CITY, MICH.

THE SHIP OWNERS DRY DOCK CO.

OLD DOCK
Length of Keel Blocks 340 ft.
Width of Gate 50 ft.
Depth of Water on Keel Blocks 16 ft.



NEW DOCK
Length of Keel Blocks 300 ft.
Width of Gate 52 ft.
Depth of Water on Keel Blocks 14 ft.

GENERAL REPAIR WORK PROMPTLY ATTENDED TO.
Being equipped with Lucigen Lights we can do work at night as well as day.
TELEPHONE 1635. Foot of Weddell St., CLEVELAND, O.